Operator Interface Products

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Specifications

See Eaton's Cutler-Hammer Product Specification Guide:
1995 CSI Format: . . . . . **Section 16902**
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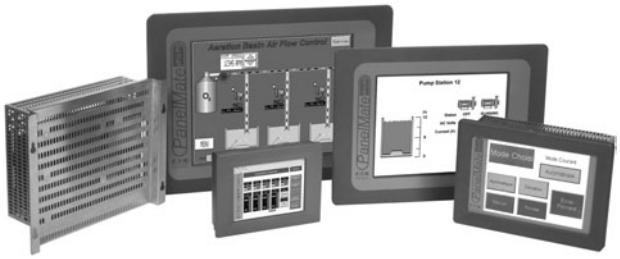

PanelMate Operator Interface

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PanelMate

Product Description

Machine builders and manufacturing system designers increasingly recognize the benefits of using electronic operator interface devices to replace pushbuttons, lights, gauges and other traditional hardwired devices.

Most choose dedicated operator interface systems because they are easy to use, fully integrated and cost-effective.

PanelMate: The Industry Standard

PanelMate units are flexible, expandable, cost-effective alternatives to traditional operator control panels. A single PanelMate unit easily replaces panels that once contained numerous pushbuttons, indicator lights, thumbwheels, message displays and alarm annunciators.

PanelMate Technology Benefits

- Replaces conventional control panels at less than half the cost.
- Gives operators more information for better control decisions.
- Standardizes operator stations and minimizes operator training.
- Saves processor memory by utilizing Boolean logic and math functions.
- Reduces hardwiring costs and minimizes installation time.
- Adds advanced capabilities such as machine diagnostics, troubleshooting, trending and alarms at no additional cost.
- Automates documentation.
- Meets tight panel space requirements.

How to Order

PanelMate System Components

Each PanelMate system requires component selection from three major categories:

- Operator Interface — the online unit or operator station.
- Configuration Software — PC-based software, used to configure and transfer applications to and from the Operator Interface.
- Connectivity — includes optional cables, hardware interfaces and software utilities.

Selection Criteria

- First, select the most appropriate Operator Interface, Display Type and Size, and Operator Input options for the customer's application.
  - The selection of the Operator Interface model line is driven by such considerations as the size and complexity of the operator interface application, performance requirements, as well as the economic factors of the overall control system.
  - The Display Type is chosen based on the operator's needs — text only, text and graphics, color or grayscale. Display Size is selected based on application complexity and the operator's proximity to the Operator Interface.
  - Operator Input options include either touchpanel (keypad) or touchscreen Operator Interface models. Criteria for selection of the best input method include environmental factors (airborne particles, grease, etc.), and application design (numeric input, one-touch control, etc.).
- Second, select the appropriate configuration editing software for the chosen Operator Interface.

  Note: If the customer already has configuration software, they may only need a software upgrade.
- Finally, select required connectivity features, such as interface cables, optional high-speed interface cards, and, for some Allen-Bradley® drivers, licensing enabler utilities.

  Eaton's Cutler-Hammer® interface cables are ideal for system and application testing. For actual plant floor applications, custom cables are generally required to meet the customer's requirements for length, environment, termination, etc.

  Note: In order to specify the proper cabling and other connectivity options, you must know the target PLC or controller to be used with the Operator Interface. Required information may include the PLC brand, Model Number, software/firmware revision level, and hardware/software interface type.

Table 34.0-1. PanelMate Operator Stations at a Glance

Model	Description	Typical Application
PanelMate Power Pro	7.4" grayscale LCD, 7.7" Color DSTN or 8.4", 10.4", 13" Color TFT Full VGA display options, Touchpanel or Touchscreen options, Stainless Steel options	Small to large applications
PanelMate ePro	7.7" Color DSTN, 8.4", 10.4" Color TFT display or Blind Node (no display) options, Touchpanel or Touchscreen options, Stainless Steel options, OPC and Application Kit options, Ethernet standard	Small to large applications
PanelMate ePro ES	5.7" Color STN display with Touchscreen, Ethernet and OPC standard	Small applications
PanelMate ePro PS	8.4", 12.1", 15.0" Color TFT display with Touchscreen or Blind Node (no display) options, Stainless Steel options, Ethernet and OPC standard	Small to large applications
Flat Panel Displays	12.1", 15" and 17" Color TFT displays with Touchscreen. Recommended for use with the PanelMate Blind Node Models	Small to large applications
PanelMate PC Pro	PanelMate Runtime Software License for running PanelMate on a PC	Large applications with PC requirements
PanelMate Client/Server	PanelMate Client/Server Runtime Software and License (supports up to 11 clients)	Large applications with Windows® 2000 Server, Multi-client, Thin Client and/or wireless application requirements
Micro PanelMate	Text (2 x 20) or graphic (3.0") LCD display options with 20 key numeric keypads	Small to medium applications

PanelMate Power Pro Overview

PanelMate Power Pro

Product Description

The PanelMate Power Pro Operator Interfaces are a cost-efficient, easy-to-integrate alternative to traditional hardwired operator panels in control systems. The PanelMate Power Pro products pack the latest advanced-technology operator interface functionality into a unique, versatile line of flatpanel designs.

The PanelMate Power Pro products have the same cutout and stud pattern as earlier model PanelMate products and offer increased capabilities.

Control functions, such as machine status indication and pushbutton-style control, are accomplished using built-in templates displayed on a vivid screen. The PanelMate Power Pro simulates the action and performance of hard-wired pushbuttons using sealed, recessed membrane control buttons on the touchpanel version or on-screen buttons on the touchscreen version. The proven intuitive operation remains the same in all PanelMate products.

Operators select templates or graphic images by moving a finger around the touchpanel or touchscreen. After selecting a template, the operator performs control actions by pressing control buttons. New functionality also allows users to navigate and initiate control action with just one touch (touchscreen only), if such functionality is configured for the unit using the PanelMate Power Pro Windows-based configuration software.

Simplified Machine Control

- Higher level functions such as machine setup, diagnostics, alarming, trending and custom graphics can be configured easily using the PanelMate Power Pro configuration software. This intuitive software significantly reduces the time and effort needed to create your application. The software also provides complete compatibility of configuration files with other PanelMate series products (Version 2.1 or later).
- Realistic representations of machines and processes can be displayed on all PanelMate models. Detailed symbols can be designed to the pixel level or selected from a symbol library of over 3000 customizable and scalable images. These graphics make displays more meaningful and allow operators to easily recognize and understand the displayed data. The eight-state blinking feature can be used to highlight critical functions, provide animation effects and attract the operator's attention to important information.
- Application flexibility is provided by hardware features that include:
  - Approved for use in Type 4, 4X and 12 installations when properly mounted in a correspondingly rated enclosure. Stainless steel models available for PanelMate Power Pro 3000 and 5000 series.
  - Executive firmware stored in non-volatile flash memory for easy upgrades.
  - Battery-backed clock that can be synchronized externally.
  - Two RS-232/RS-422 serial ports for communications or printing alarms and messages (except PM 1100 models).
  - Optional, high-speed, network interface boards for connectivity to a variety of networks.
  - System diagnostics.
  - All PanelMate Power Pro systems meet UL®, CSA®, CE requirements and UL/CSA Class I Division 2 Groups A, B, C, D requirements.
  - All PanelMate Power Pro models have up to 100-page, 5000-message capacity.
  - PanelMate Pro LT supports up to 64 I/O references (expandable up to 512 I/O points) and a single communication driver.
- Display features on all units provide VGA (640 x 480) resolution with:
  - 256-level grayscale on the grayscale versions or 256-color palette on color versions.
- Touchpanel for all models include a display with electronics module and membrane keypad with off-screen 3 x 5 cell control selection, cancel key and numeric entry keypad, with four redefinable membrane control buttons to the right of the display. The PanelMate 5000 units have five membrane control buttons.
- Touchscreen for all models include a display with electronics module and on-screen 3 x 5 cell control selection, four redefinable on-screen control buttons, on-screen cancel key and non-intrusive, pop-up, on-screen numeric keypad. The PanelMate 5000 units have five on-screen control buttons.

Displays Available

- 7.4-inch grayscale LCD Flatpanel (PM Pro LT 1100, PMPP 1700).
- 7.7-inch color DSTN Flatpanel (PM Pro LT 1100, PMPP 1700).
- 8.4-inch color TFT Flatpanel (PMPP 1700).
- 10.4-inch color TFT Flatpanel (PMPP 3000).
- 13-inch color TFT Flatpanel (PMPP 5000).
- Split Architecture 13-inch color TFT Flatpanel (PMPP 5000).
- All models available in touchscreen and touchpanel.

PanelMate Pro LT 1100

Product Description

The PanelMate Pro LT 1100 is available with a 7.4-inch grayscale LCD or 7.7-inch color Dual Scan (DSTN) display with full VGA resolution and 256 shades/colors. Models are available with either touchscreen (acrylic) or touchpanel for operator input and can be mounted in a 4-inch deep enclosure. The PanelMate Pro LT 1100 supports applications with up to 64 I/O references and a single communication driver. The number of supported I/O references can be upgraded to 512 I/O points (done in blocks of 64 I/O points — see 1100TAG Options). The PanelMate Pro LT 1100 requires 24 Vdc power input.

Product Selection

Table 34.1-2. PanelMate Pro LT 1100 Operator Stations

Description	Catalog Number
7.4-Inch Grayscale LCD Display	
Touchpanel	**1155K**
Touchscreen	**1155T**
7.7-Inch Color DSTN Display	
Touchpanel	**1175K**
Touchscreen	**1175T**

PanelMate Power Pro 1700

Product Description

The PanelMate Power Pro 1700 is available with a 7.4-inch grayscale LCD, 7.7-inch color Dual-Scan (DSTN) or 8.4-inch color TFT display with full VGA resolution and 256 shades/colors. Models are available with either touchscreen (acrylic) or touchpanel for operator input and can be mounted in a 4-inch deep enclosure. The PanelMate Power Pro models require 24 Vdc power input.

Product Selection

Table 34.1-3. PanelMate Power Pro 1700 Operator Stations

Description	Catalog Number
7.4-Inch Grayscale LCD Display	
Touchpanel	**1755K**
Touchscreen	**1755T**
7.7-Inch Color DSTN Display	
Touchpanel	**1775K**
Touchscreen	**1775T**
8.4-Inch Color TFT Display	
Touchpanel	**1785K**
Touchscreen	**1785T**

PanelMate Power Pro 3000

Product Description

The PanelMate Power Pro 3000 is available with a 10.4-inch color TFT display with full VGA resolution and 256 colors. Models are available with either touchscreen (glass or acrylic) or touchpanel for operator input and with painted steel or stainless steel front panels. These units can be mounted in a 5-inch deep enclosure. The PanelMate Power Pro models require 24 Vdc power input.

Product Selection

Table 34.1-4. PanelMate Power Pro 3000 Operator Stations

Description	Catalog Number
10.4-Inch Color TFT Display	
Touchpanel Painted Steel	**3985K**
Touchpanel Stainless Steel	**3985SK**
Touchscreen (glass) Painted Steel	**3985T**
Touchscreen (glass) Stainless Steel	**3985ST**
Touchscreen (acrylic) Painted Steel	**3985AT**
Touchscreen (acrylic) Stainless Steel	**3985SAT**

PanelMate Power Pro 5000

Product Description

The PanelMate Power Pro 5000 features a large, easy-to-see 13-inch color TFT display with full VGA resolution and 256 colors. Models are available with a touchscreen (glass) or touchpanel for operator input and with painted steel or stainless steel. The touchpanel versions are available with either of two designs — single-piece front panel or the split architecture design. The touchpanel models can be mounted in a 19-inch rack. The cutout and stud patterns for all models are the same as earlier versions of PanelMate products that featured the 13-inch display, including the PanelMate I/II/III. The PanelMate Power Pro models require 24 Vdc power input. The PanelMate Power Pro 5000 can also be ordered with an ac power converter mounted on the back.

Product Selection

Table 34.1-5. PanelMate Power Pro 5000 Operator Stations

Description	Catalog Number
13-Inch Color TFT, Single Piece Front Panel	
Touchpanel Painted Steel	**5785K**
Touchpanel Stainless Steel	**5785SK**
Touchpanel Painted with ac Power Converter	**5785K-AC**
Touchscreen Painted Steel	**5785T**
Touchpanel Stainless Steel	**5785ST**
Touchscreen Painted with ac Power Converter	**5785T-AC**
13-Inch Color TFT, Split Architecture Design	
Touchpanel Painted Steel	**5485K**
Touchpanel Stainless Steel	**5485SK**
Touchpanel Painted with ac Power Converter	**5485K-AC**

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Accessories ..... **Page 34.4-1**

PanelMate ePro

PanelMate ePro

Product Description

The PanelMate ePro combines the best features of the PanelMate operator interface and open platform computing to create a very powerful operator interface solution. The PanelMate ePro is designed to meet the growing use of open networks, such as Ethernet, to communicate and share data on the factory floor.

PanelMate ePro models come in a variety of different configurations.

Users select the display type as 7.7-inch color DSTN, 8.4-inch color TFT, or 10.4-inch color TFT. If a larger display is required or there is a need to mount a display separate from the electronic components of the ePro, then the user should select the PanelMate ePro Blind Node with a flat panel display (see **Table 34.1-9** for additional information about displays).

Next, the user needs to determine the communication requirements. If only one type of PLC/protocol will be required for communications, then the PanelMate ePro with the Bundled OPC is recommended. If more than one protocol is required, then the PanelMate ePro base model should be purchased along with the required OPC servers (see **Table 34.2-3** for additional information about OPC servers). And if native serial drivers can be used, then the base model is also recommended (see **Table 34.2-4** for details on native drivers).

Next, the user needs to determine if any additional application features are needed. The PanelMate ePro XE models feature support for a Document Viewer, Recipe Manager, Headline Manager and Trend Viewer. If the user only needs support for one application kit (Document Viewer, Recipe Manager or Headline Manager), then the X1 models should be selected. Note that the X1 models do not support the Trend Viewer.

Next, the user needs to determine the operator input methodology. Touchscreens or membrane keypads are available on the 8.4 and 10.4-inch color TFT models. The 7.7-inch color DSTN is available with touchscreen only.

Finally, the user needs to determine if stainless steel is required. If stainless steel is required, then the 10.4-inch color TFT keypad model should be selected with a stainless steel front panel.

Once the user has determined requirements for display size, communications, application kits, operator input and front panel material, **Table 34.1-6** can be used to determine the ideal PanelMate ePro model.

Features

- On-board Ethernet.
- Client support for OPC/DDE.
- Support for optional OPC servers (over 40 available).
- Can communicate with up to 32 devices.
- Can run on up to 32 simultaneous networks.
- Comes equipped with one ISA slot for high speed interface cards.
- Uses flash memory (no rotating media).
- Provides instantaneous shutdown.
- Configured using the same configuration software as PanelMate Power Series and Power Pro products.
- Supports existing PanelMate Power Pro and Power Series applications.
- Supports 200 pages of display information.
- Supports unlimited I/O references.
- Supports 65,000 local messages.
- Integrates easily with PLC tag files.
- Provides one-touch pushbuttons for non-critical operations and two-touch pushbuttons (select and activate) for critical operations.
- Provides multiple software password protection.
- Comes with many display size and type options including a Blind Node (no display).
- Full VGA resolution (640 x 480), 256 colors.

Standards and Certifications

- CE.
- UL/CUL® and CSA Hazardous Locations, Class I, Div. 2, Groups A, B, C, D.
- Emissions — CISPR 22 Class A — Radiated and Conducted.
- Noise Immunity: IED 801-2, 3, 4, 6, 8 and IEC 61000-4-2, 3, 4, 5, 6, 8.

Technical Data

Specifications

- Voltage 24 Vdc, -15%/+20%.
- Approved for Type 4, 4X and 12 installations when properly mounted in a correspondingly rated enclosure.
- One Ethernet 10/100Base-T port for communications.
- One 9-pin DB9(M) RS-232 serial port for communications.
- One PS/2 mouse interface.
- One PS/2 keyboard interface.
- One USB interface.

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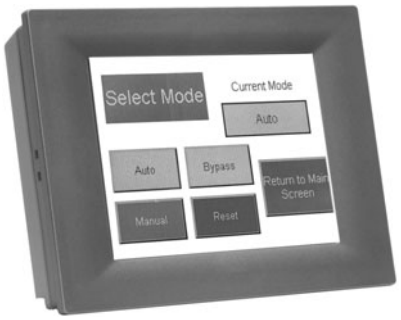
Product Selection

Table 34.1-6. PanelMate ePro Operator Stations

OPC/Kits Features	7.7" Color DSTN Touchscreen	8.4" Color TFT Touchscreen	10.4" Color TFT Touchscreen ①	Blind Node/No Display	8.4" Color TFT Keypad	10.4" Color TFT Keypad ①
	Catalog Number			Catalog Number		
Base 4 Kits 1 Selectable Kit	7575T-8 7575T-8XE 7575T-8X1	7585T-8 7585T-8XE 7585T-8X1	7585T-10 7585T-10XE 7585T-10X1	7500 7500XE 7500X1	7585K-8 7585K-8XE 7585K-8X1	7585K-10 7585K-10XE 7585K-10X1
Bundled OPC Bundled OPC — 4 Kits Bundled OPC — 1 Selectable Kit	7575T-8-OPC 7575T-8XE-OPC 7575T-8X1-OPC	7585T-8-OPC 7585T-8XE-OPC 7585T-8X1-OPC	7585T-10-OPC 7585T-10XE-OPC 7585T-10X1-OPC	7500-OPC 7500XE-OPC 7500X1-OPC	7585K-8-OPC 7585K-8XE-OPC 7585K-8X1-OPC	7585K-10-OPC 7585K-10XE-OPC 7585K-10X1-OPC

① The SST models are designated by placing an "**S**" after the 7585.

PanelMate ePro ES



PanelMate ePro ES

Product Description

The PanelMate ePro ES Operator Interface combines the tradition of PanelMate's intuitive operation with the latest networking connectivity capabilities found in the industrial marketplace. It is a small-sized, cost-effective package that is powered by Microsoft® embedded Windows .NET™ technologies.

The ePro ES model 7475T-6 delivers quality and reliability while providing all the benefits of a PanelMate product in a compact, low-cost operator panel that is ideal for small applications. It is a unique balance of performance and solution that is ideal for replacing hardwired pushbuttons, pilot lights, and other panel devices. The NEMA® 4 and IP65 enclosure ratings and resistive touchscreen technology allow for gloved hand operation in harsh industrial environments.

The PanelMate ePro ES is the ideal solution for HMI and OI applications with space and cost constraints. For traditional PanelMate 1000 users, an adapter plate is offered as an accessory that allows the ePro ES 7475T-6 model to mount directly in an existing PanelMate 1000 cutout, making hardware upgrades easy.

Whether replacing hardwired pilot devices and pushbuttons, or providing machine control for cost-sensitive manufacturing processes, the ePro ES can fit from both a form and functional standpoint. In monitoring and diagnostic applications, as well as operator controls for critical start/stop, ramp/jog, and set point adjustments, the ePro ES offers a reliable and safe touchscreen interface for a wide range of industrial uses such as:

- Discrete manufacturing machine diagnostics and controls.
- Pump station control panels in the oil and gas industries.
- Remote water and wastewater control panels.
- Monitoring and control panels for local facilities/air handling equipment.
- Tire manufacturing mixing and building processes.
- Industrial and commercial power house controls; building HVAC controls.
- Automotive press and machine parts controls.

The ePro ES is configured with the ePro Canvas™ editing software. This new and contemporary editing software is a common tool for both the ePro ES and ePro PS family of operator interface products.

Features

Display

- 5.7-inch (145 mm), Color STN display.
- 256 colors.
- Resolution: 1/4 VGA (320 x 240).
- Brightness: 165 nits (165 cd/m^2).
- Backlight: 20,000 hours typical life.
- Auto dimming.

Operator Entry

- Touchscreen interface with resistive technology for gloved hand operation.
- Pop-up, on-screen alphanumeric keypad support.

Hardware/Mounting

- Single-piece lightweight design for easy panel mounting.
- Clip-mount for standard installation.

Powerful OI Capabilities

- Supports ePro Canvas controls.
- Built-in two-touch control.
- Full math and logic expressions.

Communications and I/O Capabilities

- Built-in OPC Client/Server with support for major PLC serial and Ethernet TCP/IP protocols.
- One integrated ethernet — RJ45.
- Two serial ports: one RS-232, one RS-485.
- Two PS/2 ports (for optional keyboard/mouse interface).
- CompactFlash® Memory Interface.

Technical Data

Voltage

- 24 Vdc, -15%/+15%.

Power Consumption

- 15 watts.

Heat Output

- 15 watts (52 BTU/hour).

Current

- 1.5 amperes.

Peak Inrush Current

- 7 amperes.

Installation Rating

- Approved for use in NEMA 4 and IP65 installations when properly mounted in a correspondingly rated enclosure.

System Ambient Temperature

- Operating: 0 – 50°C (32 – 122°F).
- Non-operating: -20 – 60°C (-4 – 140°F).

System Vibration

- Operating: 10 – 18 Hz; 1.5 mm peak-to-peak displacement; 18 – 500 Hz; 1 G acceleration.
- Non-operating: 10 – 18 Hz; 1.5 mm peak-to-peak displacement; 18 – 500 Hz; 1 G acceleration.

System Shock

- Operating: 1 G.
- Non-operating: 1 G.

Relative Humidity

- Operating: 10 – 95% at 40°C non-condensing.
- Non-operating: 10 – 95% at 40°C non-condensing.

Agency Certifications

- CE mark.
- FCC Class B.

Overall Dimensions (H x W x D)

- 5.82 x 7.68 x 1.57 in. (147.8 x 195.1 x 40.0 mm).

Cutout Dimensions (H x W)

- 5.55 x 7.40 in. (141.0 x 188.0 mm).

Weight

- 1.7 lbs. (0.80 kg).

Product Selection

Table 34.1-7. PanelMate ePro ES Operator Interface (74xx Series)

Description	Catalog Number
5.7" Color STN Display, Touchscreen, OPC, DC, User Manual on CD-ROM	**7475T-6**

PanelMate ePro PS

PanelMate ePro PS

Product Description

The PanelMate ePro PS is a high-performance yet cost-effective Operator Interface. The PS series carries on the PanelMate tradition of performance in balance with ease of use. The ePro PS sets the standard for hybrid OI systems by combining the flexibility of Microsoft's Windows XP Embedded operating system with the stability and reliability achieved through the solid-state hardware design and exclusive Protect Mode that provides protection for the operating system and software.

The ePro PS family of products includes models with 8, 12 and 15-inch color TFT touchscreen displays. There is also a Blind Node (no display) model that provides a variety of mounting configuration options and the flexibility of connecting to different-sized external; displays including Eaton's family of flat-panel touchscreen displays.

Whether replacing hardwired pilot devices and pushbuttons or providing machine control and even SCADA functions such as data archiving, recipe management and Internet browsing, the ePro PS can fit from both a form and functional standpoint. In monitoring and diagnostic applications, as well as operator controls for critical start/stop, ramp/jog, and set point adjustments, the ePro PS offers a reliable and safe interface for a wide range of industrial applications such as:

- Discrete manufacturing machine diagnostics and controls.
- Oil platform monitoring and control in the petroleum industry.
- Central and remote water and wastewater control panels.
- Monitoring and control panels for local facilities/air handling equipment.
- Tire manufacturing mixing and building processes.
- Industrial and commercial power house controls; building HVAC controls.
- Material handling and palletizing monitoring and control.
- Automotive press and machine parts controls.

The ePro PS is configured with the ePro Canvas editing software. This new and contemporary editing software is a common tool for both the ePro ES and ePro PS family of Operator Interface products.

Features

Display 7685T-8

- 8.40-inch (213.4 mm), color TFT display, 16 million colors.
- Resolution: VGA (640 x 480).
- Brightness: 300 nits (300 cd/m^2).
- Backlight: field replaceable, 50,000 hours typical life.
- Auto dimming.

Display 7685T-12

- 12.10-inch (307.3 mm), color TFT display, 16 million colors.
- Resolution: SVGA (800 x 600).
- Brightness: 300 nits (300 cd/m^2).
- Backlight: field replaceable, 50,000 hours typical life.
- Auto dimming.

Display 7685T-15

- 15.00-inch (381.0 mm), color TFT display, 16 million colors.
- Resolution: XGA (1024 x 768).
- Brightness: 250 nits (250 cd/m^2).
- Backlight: field replaceable, 50,000 hours typical life.
- Auto dimming.

Blind Node 7600

- Resolution: SVGA (800 x 600), XGA (1024 x 768), SXGA (1280 x 1024), UXGA (1600 x 1200).
- Colors: 16 Million colors (SXGA and UXGA — 65K colors).

Operator Entry

- Touchscreen interface with resistive technology for gloved hand operation.
- Pop-up, on-screen alphanumeric keypad support.

Hardware/Mounting

- Single-piece design for easy panel mounting (except 7600).

Powerful OI Capabilities

- Supports ePro Canvas controls.
- Built-in two-touch control.
- Full math and logic expressions.

Communications and I/O Capabilities

- One integrated ethernet port — 10/100Base-T.
- Two serial ports: one RS-232, one RS-232/422/485 optically isolated.
- Four USB ports (two V1.1, two V2.0).
- One CompactFlash memory card slot.
- Two PCMCIA Type II slots (or one Type III).
- Support for optional PCI adapter (12, 15-inch, Blind Node models).
- Built-in OPC Client/Server with support for over 50 OPC drivers for both Ethernet and serial connectivity.

Technical Data

Voltage

- 24 Vdc, -15%/+20%.

Power Consumption

- 7685T-8, 28 watts.
- 7685T-12, 32 watts.
- 7685T-15, 44 watts.
- 7600, 20 watts.

Heat Output

- 7685T-8, 28 watts (96 BTU/hour).
- 7685T-12, 32 watts (109 BTU/hour).
- 7685T-15, 44 watts (150 BTU/hour).
- 7600, 20 watts (68 BTU/hour).

Current

- 7685T-8, 1.3 amperes.
- 7685T-12, 1.5 amperes.
- 7685T-15, 2.0 amperes.
- 7600, 1.0 amperes.

Peak Inrush Current

- 7685T-8, 7.0 amperes.
- 7685T-12, 7.0 amperes.
- 7685T-15, 8.0 amperes.
- 7600, 7.0 amperes.

Installation Rating

- The 7685T Series is approved for use in Type 4, 4X, 12 and IP65 installations when properly mounted in a correspondingly rated enclosure.

System Ambient Temperature

- Operating: 0 – 55°C (32 – 131°F), 0 – 50°C (32 – 122°F) with optional PCI adapter.
- Non-operating: -25 – 70°C (-13 – 158°F).

System Vibration

- Operating: 1 G from 5 – 500 Hz.
- Non-operating: 1 G from 5 – 500 Hz.

System Shock

- Operating: 30 G.
- Non-operating: 30 G.

Relative Humidity
- Operating: 20 – 95% non-condensing.
- Non-operating: 20 – 95% non-condensing.

Altitude
- Operating: 10,000 ft. (3,048 m) above sea level.
- Non-operating: 40,000 ft. (12,192 m) above sea level.

Emissions
- CISPR 22 Class A-Radiated and Conducted.

Noise Immunity
- IEC 801-2, 3, 4, 6, 8.
- IEC 6100-4-2, 3, 4, 5, 6, 8.

Agency Certifications
- CE mark.
- UL/CUL and CSA Class I, Div 2, Groups A, B, C, D.

Overall Dimensions (H x W x D)
- 7685T-8 — 7.63 x 10.51 x 3.90 in. (193.8 x 267.0 x 99.1 mm).
- 7685T-12 — 11.60 x 15.90 x 3.90 in. (294.6 x 403.9 x 99.1 mm).
- 7685T-15 — 13.50 x 18.60 x 5.00 in. (342.9 x 472.4 x 127.0 mm).
- 7600 — 9.30 x 12.00 x 4.90 in. (236.2 x 304.8 x 124.0 mm).

Note: Add 1.30 in. (33.0 mm) to Depth for optional PCI adapter.

Cutout Dimensions (H x W)
- 7685T-8 — 6.50 x 9.38 in. (165.1 x 238.3 mm).
- 7685T-12 — 10.12 x 14.34 in. (257.0 x 364.2 mm).
- 7685T-15 — 12.05 x 17.01 in. (306.1 x 432.1 mm).
- 7600 designed for mounting in a cabinet.

Weight
- 7685T-8 — 7.0 lbs. (3.18 kg).
- 7685T-12 — 14.0 lbs. (6.35 kg).
- 7685T-15 — 18.0 lbs. (8.16 kg).
- 7600 — 5.0 lbs. (2.27 kg).

Product Selection

Table 34.1-8. PanelMate ePro PS Operator Interface (76xx Series)

Description	Catalog Number
8.4" Color TFT Display, Touchscreen (Acrylic), OPC, DC, User Manual on CD-ROM	**7685T-8**
12.1" Color TFT Display, Touchscreen (Glass), OPC, Painted Steel, DC, User Manual on CD-ROM	**7685T-12**
12.1" Color TFT Display, Touchscreen (Glass), OPC, Stainless Steel, DC, User Manual on CD-ROM	**7685ST-12**
15.0" Color TFT Display, Touchscreen (Glass), OPC, Painted Steel, DC, User Manual on CD-ROM	**7685T-15**
15.0" Color TFT Display, Touchscreen (Glass), OPC, Stainless Steel, DC, User Manual on CD-ROM	**7685ST-15**
Blind Node (no display – see **Table 34.1-9** for Display Options), OPC, DC, User Manual on CD-ROM	**7600**

PanelMate Flat Panel Displays

TFT Flat Panel Display

Product Description

Three sizes of color TFT flat panel displays with touchscreens are available for use with the PanelMate ePro Blind Nodes. Models are available in 12.1, 15.0 and 17.0-inch sizes. These displays are constructed to handle rugged environments and can be easily mounted in a cabinet or a kiosk.

Features

- 12.1-inch SVGA, 15.0-inch XGA and 17.0-inch SXGA Color TFT LCD displays.
- 5-wire analog resistive ELO touchscreen.
- Stainless steel open-frame architecture.
- Aluminum front bezel.
- Strengthened glass protects the front panel from shock damage.
- Approved for use in Type 4, 12 and IP65 installations when properly mounted in a correspondingly rated enclosure.

Standards and Certifications

- CE.
- FCC Class A.

Technical Data

Specifications

12.1-Inch Models

- System ambient operating temperature: 32 – 122°F (0 – 50°C).
- System vibration: 10 – 200 Hz 0.15 mm 10 cycle 1 G.
- System shock: 15 G peak acceleration (50 ms duration).
- Voltage: 100 – 240 Vac.
- Backlight: 50,000 hours typical life.
- Dimension (H x W x D): 11.46 x 14.41 x 1.92 inches (291.1 x 366.0 x 48.8 mm).
- Cutout (H x W): 10.16 x 13.11 inches (258.1 mm x 333.0 mm).
- Weight: 12 lbs. (5.5 kg).

15.0-Inch Models

- System ambient operating temperature: 32 – 122°F (0 – 50°C).
- System vibration: 10 Hz 0.15 mm 10 cycle 1 G.
- System shock: 30 G peak acceleration (11 ms duration).
- Voltage: 100 – 240 Vac.
- Backlight: 50,000 hours typical life.
- Dimension (H x W x D): 13.23 x 17.48 x 2.10 inches (336.0 mm x 444.0 mm x 53.3 mm).
- Cutout (H x W): 11.77 x 15.94 inches (299.0 x 404.9 mm).
- Weight: 14 lbs. (6.5 kg).

17.0-Inch Models

- System ambient operating temperature: 32 – 122°F (0 – 50°C).
- System vibration: 10 – 500 Hz.
- System shock: 30 G peak acceleration (11 ms duration).
- Voltage: 100 – 240 Vac.
- Backlight: 30,000 hours typical life.
- Dimension (H x W x D): 15.71 x 19.02 x 2.25 inches (399.0 x 483.1 x 57.2 mm).
- Cutout (H x W): 14.45 x 17.68 inches (367.0 x 449.1 mm).
- Weight: 34 lbs. (15.4 kg).

Product Selection

Table 34.1-9. Flat Panel Displays with Touchscreens

Description	Catalog Number
12.1" Color TFT Display, ELO Touchscreen (Glass), ac	**7585DT-12**
15.0" Color TFT Display, ELO Touchscreen (Glass), ac	**7585DT-15**
17.0" Color TFT Display, ELO Touchscreen (Glass), ac	**7585DT-17**

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PanelMate PC Pro

PanelMate PC Pro

Product Description

PanelMate PC Pro is an online version of the PanelMate Power Pro executive software and communication drivers, designed to run on an industry-standard Intel-based personal computer and the Windows NT 4.0 operating system. PanelMate PC Pro is a full 32-bit, Windows NT-compliant software package with 32-bit Windows NT PLC drivers, created to take advantage of standard, open architecture hardware and software developed by other vendors, while maintaining the PanelMate's legendary simplicity and ease of use.

PanelMate PC Pro and Industrial PC

PanelMate PC Pro software can be installed on any PC running Windows NT 4.0 or greater which meets the following minimum requirements:

- Intel Pentium 133 MHz (200 MHz recommended).
- 32 MB DRAM (64 MB recommended).
- 1 GB hard drive.
- VGA controller and monitor.
- Pointing device (touchscreen preferred).
- Windows NT Workstation V 4.0.

Benefits

- PanelMate PC Pro allows the user to tap into the valuable data in PanelMate from other PC applications because PanelMate PC Pro is open — Bring data from the plant level down to PanelMate, or feed data from PanelMate PC Pro to other information systems in the plant.
- PanelMate PC Pro adheres to Windows standards and is 100% Windows compatible, allowing you to use the extensive networking capabilities of Windows NT.
- Use of an open hardware/software platform allows the customer to precisely meet their ever-changing needs with easy processor or capacity upgrades, using off-the-shelf hardware. Supplemental functionality can be added using off-the-shelf software, allowing the user to incorporate control, operator interface, analysis, reporting, communications, etc., into one workstation.
- Use an efficient, Dynamic Link Library (DLL) interface to connect the tried-and-true PanelMate operator interface with Steeplechase's popular Visual Logic Controller soft logic PC control package.
- PanelMate PC Pro has the same functionality as the PanelMate Power Pro and is fully compatible with applications created for PanelMate Power Series/PanelMate Power Pro products. Any Power Series/Power Pro application will run on PanelMate PC Pro.

Note: When purchasing a PanelMate ePro Operator Interface, PanelMate PC Pro is already integrated and ready to run.

Product Selection

Table 34.1-10. PanelMate PC Pro Runtime Hardware Key and License

Description	Catalog Number
Runtime Hardware Key to Enable PanelMate PC Pro Runtime Software Key connects to the PC parallel port and has pass-through capabilities. The hardware key is required for PanelMate online operation.	**PMPC-RT**

Note: Runtime software is included with PanelMate Configuration Software #PMPROSW and #PMPROSWSL.

PanelMate Client/Server

Product Description

Cutler-Hammer PanelMate Client/Server software from Eaton Corporation works in conjunction with Microsoft Windows 2000 Server to enable users to run multi-client sessions of PanelMate runtime software.

Application Description

Figure 34.1-1 illustrates how multi-client PanelMate sessions can be run using PanelMate Client/Server software.

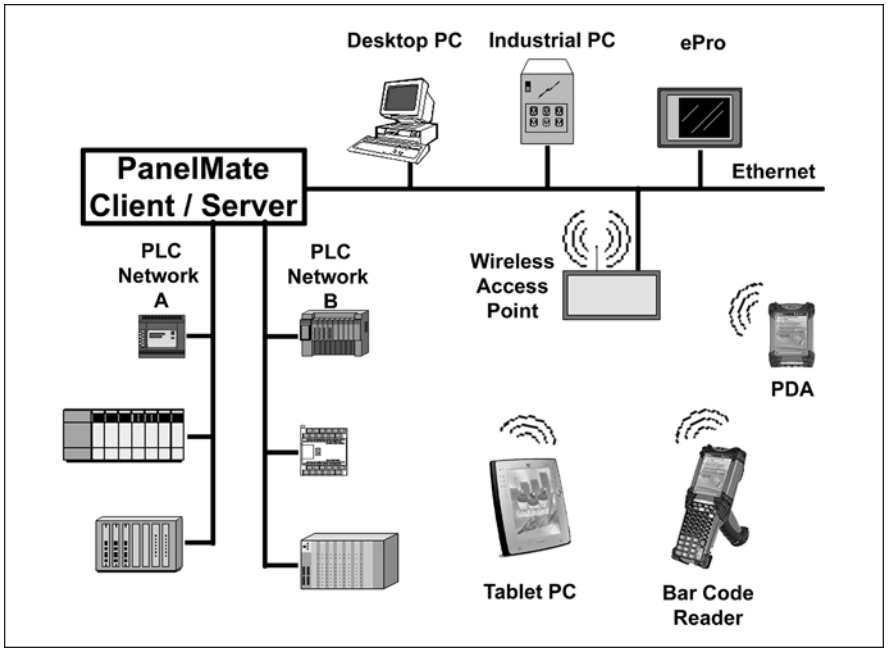

Figure 34.1-1. Diagram — Multi-client PanelMate Sessions

Features

- Reduces hardware costs, since:
  - The number of PanelMate operator interface units required is reduced
  - Fewer applications, such as OPC servers, are required to be purchased
- Interface costs are reduced.
- Reduces R&D costs, since only one system needs to be configured with PanelMate's software and applications.
- Reduces time spent on system and application maintenance, due to the centralization of tasks at the client/server level. The software allows for a single point of access for user roles, troubleshooting, maintenance and upgrades.
- Allows users to purchase off-the-shelf client hardware, further reducing the cost of hardware.
- Improves communications bandwidth, allowing for productivity improvements.

Product Selection

Table 34.1-11. PanelMate Client/Server Software and Licenses

Description	Catalog Number
PanelMate Client/Server Software with 1 Client Access License (maximum of 11 total clients can be used with each PanelMate server)	**PMCS-SVRCL1**
1 Client Access License for PanelMate Client/Server SW 3 Client Access Licenses for PanelMate Client/Server SW 5 Client Access Licenses for PanelMate Client/Server SW	**PMCS-CL1** **PMCS-CL3** **PMCS-CL5**

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PanelMate Power Pro, PanelMate PC Pro and PanelMate ePro Configuration Software

Application Description

Windows-based configuration software is used to create PanelMate Power Pro, PanelMate PC Pro and PanelMate ePro configurations offline on a PC. It also permits the editing of character-based configurations from earlier-version PanelMate Series products. The following items can be configured:

- One-touch control (for touchscreen models).
- Customizable pixel-level graphics.
- 8-state blink (for 256-level/color models).
- 3-level password protection.
- International character set support.
- Page change by operators and/or PLC.
- User-definable online system prompts to permit non-English or customized text that can be toggled with standard online prompts by operators.
- Alarm window with a 100-alarm capacity.

Features

- Indicator templates.
- Readout templates.
- Bar templates.
- Display templates.
- Trend templates.
- Table templates.
- Variable-size control button templates.
- Pop-up maintenance window.
- Alarm window.
- Advanced trend templates.
- Tag name file support.
- Expression management.
- 3000 symbol factory clipart.

PLC Communication Interfaces

Communication interfaces are available for the following programmable controllers and are downloaded from the configuration software.

Note: Multiple interfaces may be run simultaneously on PanelMate Power Pro 1700, 2000, 3000, 4000 and 5000 units.

- Allen-Bradley PLC-2, PLC-3, PLC-5 and SLC-500.
- Cutler-Hammer D50, D300, D320.
- GE® Fanuc® Series 5, 6, 90.
- Mitsubishi® "A" Series and "FX" Series.
- Modicon® Modbus® ASCII/RTU.
- Omron "C" Series plus CV500, CV1000.
- PLC-Direct DL 405 Family.
- Square D® SyMax.
- Siemens® S5 Series, 3964R Protocol, AS511.
- Simatic® TI 305/405 and 500/505 Series.
- Reliance AutoMate®.
- Toshiba T2.

High Speed Direct Connectivity Available

- Allen-Bradley Data Highway and Data Highway Plus.
- Allen-Bradley Remote I/O Link.
- GE Fanuc Genius® I/O Network.
- DeviceNet™.
- Modicon Modbus Plus.
- PROFIBUS®.

Transfer Cables

PanelMate configuration software packages #PMPROSW and #PMPROSWSL include a PanelMate 1100, 1700, 3000, 5000 (#0518) Transfer Serial Cable.

Product Selection

Table 34.2-1. Windows Configuration Software for PanelMate Power Pro, PanelMate PC Pro and PanelMate ePro

Description	Catalog Number
PanelMate Power Pro Windows Configuration Software and Manuals with Communication Software Interfaces for all major PLCs and High Speed Industrial Networks on CD-ROM with Tag and Expression Management and Symbol Factory Clipart. #PMPROSW includes transfer serial cable for PM1700, 3000, 5000 (#0518). #PMPROSW includes electronic copies of manuals in .PDF format. Seat license (1 user).	**PMPROSW**
Site License — See PMPROSW (for all users at 1 site location)	**PMPROSWSL**
PanelMate Power Pro Upgrade from previous PanelMate Power Series Software to PanelMate Power Pro software version on CD-ROM. Requires earlier version of PanelMate Power Series software for installation.	**PMPROSWUP**
PanelMate Power Pro Software Upgrade — Site License Requires previous installation of PanelMate Power Pro Software Site License (PMPROSWSL). On CD-ROM.	**PMPROSWSLUP**

Automation Update Service Membership

All purchases of PanelMate Power Pro software qualify you for product announcements and free service releases from the Automation Update Service when you register using the forms included in the software packages.

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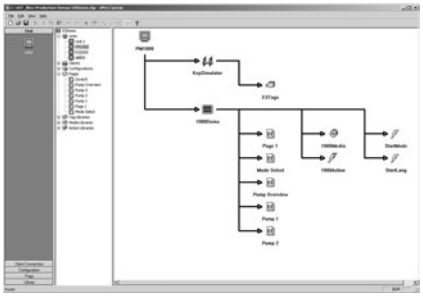
ePro Software Suite



ePro Software Suite

Product Description

The ePro Software Suite includes the ePro Canvas application development software in addition to the Runtime software for the PanelMate ePro ES and PS and the OPC servers/drivers.

The ePro Canvas software is used to develop Operator Interface applications for PanelMate ePro ES and PS industrial Operator Interface products. The powerful editing environment delivers state-of-the-art features previously available only on more expensive, high-end SCADA packages. It offers these capabilities in an intuitive and easily scalable editing interface that allows the developer to keep it simple for simple requirements yet easily scale up in capability to meet more demanding end-user requirements.

The ePro Canvas graphical user interface is built on Microsoft Windows .NET technology and offers a common look and feel with other Microsoft software-based packages. This means that developers will feel right at home with the basics of navigating the editor, thus reducing the learning curve on the software.

The included OPC servers/drivers support Ethernet and serial connectivity to virtually any PLC platform or network, as well as a wide array of drives, motion controllers and databases. No additional fees or activation are required.

Features

Support is provided for the following:

- Re-use and collaboration.
- Modern suite of page controls.
- Integrated multi-language support.
- Multiple display resolutions.
- Tag libraries.
- Blinking colors.
- Detailed multi-color graphic images.
- Date entry (numeric, alphanumeric, button control).
- Alarming.
- Document viewer (htm, pdf, txt, jpg).
- Alarm and event viewer.
- Event based actions.
- Easy navigation.

Hardware Requirements

Minimum recommended hardware requirements for ePro Software Suite and KEPServer_ePro installation:

- Microprocessor
  - ❑ Pentium II 400 MHz.
- Hard-disk space
  - ❑ 100 MB.
- Memory
  - ❑ 128 MB.
- Standard I/O port
  - ❑ Ethernet (optional for file transfers).

Note: File transfers can be done via Ethernet or a CompactFlash reader/writer. Only one method is required at minimum.

- Drive
  - ❑ CD-ROM drive (for SW installation).
  - ❑ CompactFlash reader (optional for file transfers).

Note: File transfers can be done via Ethernet or a CompactFlash® reader/writer. Only one method is required at minimum.

- Input devices
  - ❑ Keyboard, mouse or compatible pointing device.
- Video
  - ❑ SVGA (800 x 600).
- Operating system
  - ❑ Microsoft Windows XP (SP1) or Windows 2000 (SP3).

Product Selection

Table 34.2-2. ePro Software Suite

Description	Catalog Number
Includes ePro Canvas software for developing applications, Runtime software for the PanelMate ePro ES and PS and supporting OPC servers/drivers. Single User License. On CD-ROM. Development software requires Windows 2000 or Windows XP Operating System.	**CANVAS**

PanelMate ePro and PanelMate PC Pro Communications

The PanelMate ePro and PanelMate PC Pro (Catalog Number **PMPC-RT**) can communicate with a myriad of PLCs and hardware platforms using many different protocols and network strategies. In order to provide these connectivity solutions, the following communications are supported.

OLE for Process Control (OPC)

PanelMate ePro and PanelMate PC Pro include OPC client support. This means that OPC servers can be used to provide connectivity solutions for many different types of communication protocols. OPC provides a fast, precise, economic and efficient solution to communication needs. Eaton Corporation has formed a partnership with Kepware, the leading supplier of OPC connectivity solutions, so that the following OPC servers are available to be used with the PanelMate ePro and PanelMate PC Pro.

Table 34.2-3. OPC Servers

Description	Catalog Number
Kepware OPC Servers for Allen-Bradley ■ Ethernet, DF1, ControlLogix, Unsolicited Ethernet	**KEPABSUITE**
Kepware OPC Server for Analog Devices	**KEPAND**
Kepware OPC Servers for Aromat ■ Ethernet, Serial	**KEPAROSUITE**
Kepware OPC Server for AutomationDirect/Koyo DirectNET	**KEPKDN**
Kepware OPC Server for AutomationDirect EBC	**KEPKEE**
Kepware OPC Server for AutomationDirect ECOM	**KEPKEC**
Kepware OPC Server for AutomationDirect/Koyo K Sequence	**KEPKKS**
Kepware OPC Server for Fischer & Porter Micro-DC1	**KEPMDC**
Kepware OPC Server for Busware Ethernet I/O	**KEPBSW**
Kepware OPC Server for Contrex Serial	**KEPCTX**
Kepware OPC Server for Contrex M-Series	**KEPCTM**
Kepware OPC Server for Eaton's Cutler-Hammer products	**KEPCHD**
Kepware OPC Server for DDE Client Driver	**KEPDDE**
Kepware OPC Server for Fuji Flex	**KEPFUJ**
Kepware OPC Servers for GE Fanuc ■ Ethernet, Ethernet Global Data (EGD), SNP, SNPX, CCM	**KEPGESUITE**
Kepware OPC Server for GE Fanuc Focas1 Ethernet	**KEPGFO**
Kepware OPC Server for Honeywell ■ UDC, HC900 Ethernet	**KEPHYW**
Kepware OPC Server for Idec	**KEPIDE**
Kepware OPC Server for Intelligent Actuator Super SEL	**KEPIAS**
Kepware OPC Server for IO Tech PointScan 100	**KEPIOT**
Kepware OPC Server for Mitsubishi Ethernet	**KEPMAE**
Kepware OPC Server for Mitsubishi A-Series	**KEPMTA**
Kepware OPC Server for Mitsubishi FX	**KEPMFX**
Kepware OPC Server for Mitsubishi FX Net	**KEPMFN**
Kepware OPC Servers for Modicon ■ Modbus Plus (requires SA-85 card from Square D) ■ Modbus Ethernet, Modbus ASCII Serial, Modbus RTU Serial, Modbus RTU Unsolicited	**KEPMODSUITE**
Kepware OPC Server for ODBC Client Driver	**KEPODBC**
Kepware OPC Servers for Omron ■ Host Link, Process Suite, FINS Ethernet, FINS Serial	**KEPOMSUITE**
Kepware OPC Server for Optimization OptiLogic	**KEPOOP**
Kepware OPC Server for Partlow ASCII	**KEPPAA**
Kepware OPC Server for Philips P8/PC20	**KEPPHI**
Kepware OPC Server for Siemens S5 3964R	**KEPSIE**
Kepware OPC Server for Siemens S5	**KEPSS5**
Kepware OPC Server for Siemens S7 MPI	**KEPMPI**
Kepware OPC Server for Siemens S7 200	**KEPSS7**
Kepware OPC Server for Siemens S7 200/300/400 TCP/IP Ethernet	**KEPSEN**
Kepware OPC Server for Simatic 505 Serial	**KEPSI5**
Kepware OPC Server for Simatic 505 Ethernet	**KEPS5E**
Kepware OPC Servers for SIXNET ■ EtherTRAK I/O, UDR	**KEPSXN**
Kepware for Square D SY/MAX	**KEPSQD**
Kepware OPC Servers for Thermo Westronics ■ Ethernet, Serial	**KEPTHWSUITE**
Kepware OPC Server for TIWAY Host Adapter	**KEPTIW**
Kepware OPC Servers for Toshiba ■ Ethernet, Serial	**KEPTOSSUITE**
Kepware OPC Server for Telemecanique Uni-Telway	**KEPTEL**
Kepware OPC Server for Toyopuc PC2 Serial	**KEPTPS**
Kepware OPC Server for Toyopuc PC3/PC2 Ethernet	**KEPTP3**
Kepware OPC Server for WAGO Ethernet	**KEPWGE**
Kepware OPC Server for Yaskawa Memobus Plus	**KEPYSK**
Kepware OPC Server for Yaskawa MP Ethernet	**KEPYSE**
Kepware OPC Servers for Yokogawa ■ Darwin Ethernet, Darwin Serial, DX Ethernet, DX Serial, DXP, HR, CX	**KEPYOKSUITE**

Also, by using the OPC client/server strategy and special hardware, the PanelMate ePro and PanelMate PC Pro can connect to a variety of high-speed networks. Authorized connectivity solutions are available from SST and Square D.

- SST ControlNet Interface Card and OPC Server — 5136-CN ISA.
- SST PROFIBUS DP Interface Card and OPC Server — 5136-PBMS ISA.
- Square D Modbus Plus SA-85 Interface Card — SA-85-300 ISA (OPC server purchased separately — see KEPMBP OPC server in **Table 34.2-3**).

Note: For communications using Allen-Bradley's Data Highway Plus protocol, customers can purchase an ISA interface board from Eaton (Cutler-Hammer Catalog Number **D712-DHP-ISA**). The communication driver used with the board is provided with the PanelMate Configuration Software.

Dynamic Data Exchange (DDE)

Using the Microsoft standard DDE interface, PanelMate PC Pro data can be easily and efficiently shared with any other applications that support DDE, such as Microsoft Excel®, Microsoft Access®, Visual Basic® and Visual C++. PanelMate PC Pro's built-in DDE connectivity provides simple integration with other applications for report generation, recipe management, machine setup, data analysis and archiving.

Supplied Drivers

The PanelMate Configuration Software (PMPROSW) includes communication support for many different communication protocols and strategies. The following drivers are available for use with PanelMate ePro and PanelMate PC Pro.

Table 34.2-4. Available Drivers

Driver Type	Communication Type for Controller from Supplier
Allen-Bradley DH+	Requires Communication Board Catalog Number **D712-DHP-ISA**
Allen-Bradley DH 485 Allen-Bradley DF1 Serial Cutler-Hammer D50/D300	RS-232 by using A-B KF3 module RS-232, RS-422 RS-422, RS-485
GE Master/Slave GE Peer to Peer GE Series 90 Network	RS-232, RS-422 RS-232, RS-422 RS-422
GE Series 90 Point to Point Modicon ASCII Omron®	RS-422 RS-232 RS-232, RS-422
Reliance Siemens S7 Steeplechase® VLC (Netsolver)	RS-232 RS-232 DLL

Note that the PanelMate ePro supports RS-232 communications only. A converter is required for RS-422 and RS-485 communications.

Allen-Bradley Connectivity

Remote I/O, Data Highway, Data Highway Plus

Accelerate/On Interface

Licensed under A-B patented technology, the interface provides a communication port for connecting directly to the user's choice of Allen-Bradley PLC networks: Remote I/O Link, Data Highway® or Data Highway Plus. Can be used simultaneously with PanelMate 1700, 3000 and 5000 serial ports.

Table 34.3-5. Remote I/O, Data Highway, Data Highway Plus

Description	Catalog Number
Accelerate/On™ Interface Direct connect to Remote I/O Link, Data Highway or Data Highway Plus PanelMate Power Pro 1100, 1700 PanelMate Power Pro 3000, 5000	 **1241** **1251**

Note: Includes royalty for license under Allen-Bradley patented technology.

PanelMate ePro Data Highway, Data Highway Plus

Table 34.3-6. Data Highway, Data Highway Plus

Description	Catalog Number
ISA 1 Port PanelMate PC Adapter	**D712-DHP-ISA**

Allen-Bradley PLC Network Upload/Download

"One-time use" diskette enables the PanelMate unit to upload and download PanelMate configurations to PCs via Allen-Bradley PLC networks. This Upload/Download feature can be used to conduct the following operations without having to disconnect the PanelMate Unit from the PLC, or open the enclosure to access the serial ports:

- Download configurations from a PC in a central location to PanelMate units on a network.
- Upload PanelMate configurations (while units are monitoring and controlling) to a PC for backup.
- Download new PanelMate software enhancements to units.

  Note: Requires Accelerate/On Interface (#XX41) and Windows Configuration Software or Transfer Utility option #0621.

- Requires A-B RSLinx-OEM version 2.0 or higher or A-B Interchange software.

Table 34.3-7. Allen-Bradley PLC Network Upload/Download

Description	Catalog Number
One-time use diskette. Enables upload/download on operator station.	**0524**

Allen-Bradley DH-485 (SLC-500) Communications

"One-time use" diskette. Licensed under A-B patented technology, this option enables communications to Allen-Bradley SLC-500 PLCs through the DH-485 network in a single target Power Series online unit. A-B 1747-AIC Module is only required when simultaneous interface to PanelMate and PLC programming equipment is desired.

Table 34.3-8. DH-485

Description	Catalog Number
Allen-Bradley DH-485 (SLC-500) Communications One-time use diskette PanelMate Power Pro 1100, 1700 PanelMate Power Pro 3000, 5000	 **1525** **0725**

Note: Includes royalty for license under Allen-Bradley patented technology.

Allen-Bradley Communication Cables

PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 and ePro

One 15-foot (4.6 m) cable, unless otherwise stated, for communications between a PanelMate 1100, 1700, 3000, 5000 or ePro unit serial port and the PLC communications port using D-Shell connectors. Cables used with PanelMate ePro require a DB9(M)/DB9(F) converter (converts DB9(M) to DB9(F)).

Table 34.3-9. PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 and ePro

Description	Catalog Number
1785-KE, 1771-KC, KD, KE, KF, KG AB 1747 AIC for SLC 500 (DH-485 INTFC)	**AB21** **AB23A**
AB SLC 500 Direct (6 ft./1.8 m) Cable AB SLC503/504 (RS-232) Channel 0 AB PLC5 (RS-232) Channel 0, DF1	**AB24A** **AB25** **AB26**
AB PLC5 (RS-422) Channel 0, DF1 Cable AB 1747 AIC for SLC 500, CPU Connector (J1) AB MicroLogix™ Adapter Cable (1 ft./.3 m) (DB9F to DB9M)	**AB27A** **AB28A** **AB29**

Eaton's Cutler-Hammer Connectivity

Cutler-Hammer Communication Cables

PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000, ePro

One 15-foot (4.6 m) cable, unless otherwise stated, for communications between a PanelMate 1100, 1700, 3000, 5000 or ePro unit serial port and the PLC communications port using D-Shell connectors.

Table 34.3-10. PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000, ePro

Description	Catalog Number
Cutler-Hammer D200 Cable, for use with 1100, 1700, 3000 or 5000 only	**CH21A**
Cutler-Hammer D50/D150/D300/D320 (RS-485) Cable, for use with 1100, 1700, 3000 or 5000 only	**CH22A**
Cutler-Hammer D50/D320/D32LT (RS-232) Cable for use with ePro and PMPC-RT only — requires D50CPM485	**CH23**

DeviceNet Connectivity

The PanelMate DeviceNet implementation features the ability to "monitor" status from other slave devices without the need for active involvement from the master device. When installed on DeviceNet, PanelMate can update its screens with data from the slave devices or from the PC. It can also input control (pushbutton) operations or numeric information to the PC. These capabilities permit PanelMate units to function as complete control and monitoring stations on DeviceNet.

Table 34.3-11. DeviceNet Interface

Description	Catalog Number
For all PanelMate Power Pro 1100, 1700, 3000, 5000	**1245DN**

General Electric Connectivity

GE Fanuc Genius I/O Interface to GE PLCs

This interface provides a communication port for connection to GE Series 6 and Series 90 PLCs over the Genius I/O Network.

Table 34.3-12. Genius I/O Interface

Description	Catalog Number
Genius I/O Interface For all PanelMate Power Pro 1100, 1700, 3000, 5000	**1243**

General Electric Communication Cables

PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or e-Pro

One 15-foot (4.6 m) cable, unless otherwise stated, for communications between a PanelMate 1100, 1700, 3000, 5000 or ePro unit serial port and the PLC communications port using D-Shell connectors. Cables used with PanelMate ePro require a DB9(M)/DB9(F) converter (converts DB9(M) to DB9(F)).

Table 34.3-13. PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or ePro

Description	Catalog Number
Series 90 Programming Port Series 90 (RS-422) Com 311/711 Module Series 90 (RS-232) Com 311/711 Module	**GE21A** **GE22** **GE23**
Series 6/6+ (RS-422) Com 2 – J1 Port Series 6/6+ (RS-232) Com 2 – J2 Port	**GE24** **GE25**

Mitsubishi Connectivity

Mitsubishi Communication Cables

PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or ePro

One 15-foot (4.6 m) cable, unless otherwise stated, for communications between a PanelMate 1100, 1700, 3000, 5000 or ePro unit serial port and the PLC communications port using D-Shell connectors. Cables used with PanelMate ePro require a DB9(M)/DB9(F) converter (converts DB9(M) to DB9(F)).

Table 34.3-14. PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or ePro

Description	Catalog Number
A Series — AJ71C24 Module (RS-232) A Series — AJ71C24 Module (RS-422) Cable FX/FXo Series — (RS-232/RS-422) Converter	**MI21** **MI22A** **MI23**

Modicon Connectivity

Modicon Modbus Plus PLC Network Upload/Download

"One-time use" diskette enables the PanelMate unit to upload and download PanelMate configurations to PCs via Modicon Modbus Plus PLC networks. This Upload/Download feature can be used to conduct the following operations without having to disconnect the PanelMate Unit from the PLC, or open the enclosure to access the serial ports:

- Download configurations from a PC in a central location to PanelMate units on a network.
- Upload PanelMate configurations (while units are monitoring and controlling) to a PC for backup.
- Download new PanelMate software enhancements to units.

  Note: Requires Modbus Plus Interface, Configuration Software or Transfer Utility.

Table 34.3-15. Modicon Modbus Plus Network Upload/Download

Description	Catalog Number
One-time use diskette. Enables upload/download on operator station. To operate, customer requires: 1) Modbus Plus Interface (1248) to be installed in unit 2) Windows Configuration Software OR Transfer Utility on the PC	**0548**

Modbus Plus Communications and PanelMate

This interface provides a communication port for connection to Modicon PLCs over the Modbus Plus network. Interface mounts to the back of the online unit and can be mounted in a 4-inch (102 mm) deep enclosure.

Table 34.3-16. Modbus Interface

Description	Catalog Number
Direct Modbus Plus Interface PanelMate Power Pro 1100, 1700, 3000, 5000	**1248**

Modicon Communication Cables

PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or ePro

One 15-foot (4.6 m) cable, unless otherwise stated, for communications between a PanelMate 1100, 1700, 3000, 5000 or ePro unit serial port and the PLC communications port using D-Shell connectors. Cables used with PanelMate ePro require a DB9(M)/DB9(F) converter (converts DB9(M) to DB9(F)).

Table 34.3-17. PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or ePro

Description	Catalog Number
9-Pin Modbus Micro PLC (RJ-45) Modbus Cable	**MB21** **MB22**

Omron Connectivity

Omron Communication Cables

PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or ePro

One 15-foot (4.6 m) cable, unless otherwise stated, for communications between a PanelMate1100, 1700, 3000, 5000 or ePro unit serial port and the PLC communications port using D-Shell connectors. Cables used with PanelMate ePro require a DB9(M)/DB9(F) converter (converts DB9(M) to DB9(F)).

Table 34.3-18. PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or ePro

Description	Catalog Number
C Series (RS-232) CV Series (RS-232)	**OM21** **OM22**
C Series (RS-422) Cable CV Series (RS-422) Cable	**OM23A** **OM24A**
CS/CQ Series (RS-232) Cable	**OM25**

PROFIBUS DP Connectivity

PROFIBUS DP Interface

This PROFIBUS DP Slave Adapter interface provides communications between a PanelMate operator interface and a PROFIBUS network without requiring any additional communications modules. A maximum of one interface can be installed on each PanelMate unit.

Table 34.3-19. PROFIBUS DP Interface

Description	Catalog Number
PROFIBUS DP Slave I/O Interface For all PanelMate Power Pro 1100, 1700, 3000, 5000	**1247**

Siemens Connectivity

PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or ePro

One 15-foot (4.6 m) cable, unless otherwise stated, for communications between a PanelMate 1100, 1700, 3000, 5000 or ePro unit serial port and the PLC communications port using D-Shell connectors. Cables used with PanelMate ePro require a DB9(M)/DB9(F) converter (converts DB9(M) to DB9(F)).

Table 34.3-20. PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or ePro

Description	Catalog Number
Siemens (RS-232) Siemens S7 HMI Cable	**SI21** **SI22**

Simatic TI Connectivity

Simatic TI Communication Cables

PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or ePro

One 15-foot (4.6 m) cable, unless otherwise stated, for communications between a PanelMate 1100, 1700, 3000, 5000 or ePro unit serial port and the PLC communications port using D-Shell connectors. Cables used with PanelMate ePro require a DB9(M)/DB9(F) converter (converts DB9(M) to DB9(F)).

Table 34.3-21. PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or ePro

Description	Catalog Number
TI 500, 305 (RS-232) TI 405 (RS-232) TI 545 (RS-232)	**TI21** **TI22** **TI23**
TI 305-02DM, TI 405 DCM (RS-422) Cable TI 545-1101 (RS-422) Cable TI 545-12102, 1104, 1105 Cable	**TI25A** **TI26A** **TI27A**

Square D Connectivity

Square D Communication Cables

PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or ePro

One 15-foot (4.6 m) cable, unless otherwise stated, for communications between a PanelMate 1100, 1700, 3000, 5000 or ePro unit serial port and the PLC communications port using D-Shell connectors. Cables used with PanelMate ePro require a DB9(M)/DB9(F) converter (converts DB9(M) to DB9(F)).

Table 34.3-22. PLC Interface Cables for PanelMate Power Pro 1100, 1700, 3000, 5000 or ePro

Description	Catalog Number
PLC Processor Cable NIM Network Interface Module Cable	**SD21A** **SD22A**

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Accessories

Transfer Serial Cable

One 15-foot (4.6 m), RS-232 cable with DB9 connectors on each end, for upload/download between standard serial PC communication port and PanelMate serial port.

Table 34.4-1. Transfer Serial Cable

Description	Catalog Number
PanelMate 1100, 1700, 3000, 5000 Additional ①	0518

① Included in configuration software package #PMPROSW and #PMPROSWSL.

Converter Connectors

Connectors that convert a 9-pin D-Shell connector to a RJ11 phone jack-style connector.

Table 34.4-2. Converter Connectors

Description	Catalog Number
RS-232 DB9 (F) / RJ11 (M) converter [converts DB9 (M) to RJ11 (M)]. Ideal for converting PMPP 1700 cables for use with PMPS 1500	0820
RS-232 RJ11 (F) / DB9 (M) converter [converts RJ11 (M) to DB9 (M)]. Ideal for converting PMPS 1500 cables for use with PMPP 1700	0821

Table 34.4-3. Storage Modules for PanelMate 1100, 1700, 3000, 5000

Description	Catalog Number
Configuration Storage Module Memory unit that allows transfer of one configuration to or from the target PanelMate unit.	0614

Mounting Collars and Plates

Mounting plates and collars can be used when replacing older PanelMate products with newer models with no or minimal cutout changes required.

Table 34.4-4. Adapter Plates (Look similar to a Painted Steel Front Panel)

Description	Catalog Number
PM 2000/Compact (24xx/25xx) Touchpanel to PM 11xxK, 17xxK, 75xxK-8 Touchpanel Plate ②	1524TP
PM 2000 (26xx/27xx) Touchpanel to PM 11xxK, 17xxK, 75xxK-8 Touchpanel Plate ②	1527TP
PM 2000 (26xx/27xx) Touchscreen to PM 11xxT, 17xxT, 75xxT-8, 76xxT-8 Touchscreen Plate ②	1527TS
PM 2000/Compact (24xx/25xx) Touchpanel to PM 11xxT, 17xxT, 75xxT-8, 76xxT-8 Touchscreen Plate	1524TPTS
PM 2000 (26xx/27xx) Touchpanel to PM 11xxT, 17xxT, 75xxT-8, 76xxT-8 Touchscreen Plate	1527TPTS
PM 1000 to PM ePro ES –6 Plate	APPM1ES6

② Cutting is required to make the cutout wider; drilling is required for new stud holes. For touchpanel units, see **Table 34.4-5** if cutting and drilling is not an option.

Table 34.4-5. Adapter Collars (Raises front of PanelMate 1.00-Inch (25.4 mm) from the Mounting Surface)

Description	Catalog Number
PM 2000/Compact (24xx) Touchpanel to PM 11xxK, 17xxK, 75xxK-8 Touchpanel Collar. For Type 12 installations only.	1524TPCOLLAR
PM 2000 (26xx/27xx) Touchpanel to PM 11xxK, 17xxK, 75xxK-8 Touchpanel Collar. For Type 12 installations only.	1527TPCOLLAR

PanelMate Overlay Kits

The overlay kits are ideal for protecting your screens from dirt, grime and abrasion and are particularly desirable for PanelMate touchscreen models installed in dirty environments. These overlays can be ordered as clear or with an additional anti-glare feature. The overlays simply adhere to the front of the display and can be easily removed and replaced when required. Five overlays are included in each kit.

Table 34.4-6. Overlay Kits

Description	Catalog Number
Anti-Glare Overlay Kit, 5 overlays/kit, for use with PanelMate 11xxT, 15xxT, 17xxT, 75xxT-8, 76xxT-8 (Touchscreen Models Only)	17AGT
Clear Protective Overlay Kit, 5 overlays/kit, for use with PanelMate 11xxT, 15xxT, 17xxT, 75xxT-8, 76xxT-8 (Touchscreen Models Only)	17CPT
Anti-Glare Overlay Kit, 5 overlays/kit, for use with PanelMate Power Pro 3000, 75xx-10 (All Models)	39AG
Clear Protective Overlay Kit, 5 overlays/kit, for use with PanelMate Power Pro 3000, 75xx-10 (All Models)	39CP
Anti-Glare Overlay Kit, 5 overlays/kit, for use with PanelMate Power Pro 5000 (All Models)	55AG
Clear Protective Overlay Kit, 5 overlays/kit, for use with PanelMate Power Pro 5000 (All Models)	55CP

PanelMate Pro LT 1100 Tags

The PanelMate Pro LT 1100 I/O Reference Point Expansion is an upgrade kit that includes a hardware key and download software. The upgrades are provided on the hardware key and are downloaded to a PanelMate Pro LT 1100 from a PC using the provided hardware key and software. The PanelMate Pro LT supports 64 I/O points as standard and can be upgraded to support a maximum of 512 I/O points (7 upgrades installed).

Table 34.4-7. PanelMate Pro LT Expansion

Description	Catalog Number
I/O Reference Point Expansion (64 points per upgrade)	
1 x 64 I/O point expansion	1100TAG1
5 x 64 I/O point expansion	1100TAG5
10 x 64 I/O point expansion	1100TAG10
50 x 64 I/O point expansion	1100TAG50

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PanelMate ePro Trend Historian and Trend Viewer Kits

These add-on kits are used in tandem with the PanelMate ePro XE models. The Trend Historian runs on a centralized computer and accepts data collected by PanelMate ePro XE with OPC Client/Server capabilities. The Trend Viewer Application Kit that is standard on all PanelMate ePro XE units can be used to access and view the archived data. The data can also be accessed and viewed on a personal computer using the optional Trend Viewer kit (Cat # **TRENDLNK**). Each Trend Historian Kit includes 1 TRENDLNK kit.

Table 34.4-8. Trend Historian and Trend Viewer Kits

Description	Catalog Number
Trend Historian with Support for 25 Tags, includes 1 copy of the TRENDLNK software	**TRENDH25**
Trend Historian with Support for 75 Tags, includes 1 copy of the TRENDLNK software	**TRENDH75**
Trend Historian with Support for 300 Tags, includes 1 copy of the TRENDLNK software	**TRENDH300**
Additional Trend Viewer for a PC, for viewing data managed by the Trend Historian	**TRENDLNK**

PanelMate ePro PS PCI Adapter Kit

The PCI Adapter Kit allows users to use their own PCI circuit board with the PanelMate ePro PS 12-inch, 15-inch and Blind Node models. The module mounts to the back of the unit and adds 1.30 inches (33.0 mm) to the depth of the unit.

Table 34.4-9. PanelMate ePro PS PCI Adapter Kit

Description	Catalog Number
PanelMate ePro PS PCI Adapter for use with the 76xx 12-inch, 15-inch, Blind Node models. Supports use of 3rd party PCI circuit boards	**76PCI**

Micro PanelMate Overview

Simplified Machine Control

Eaton Corporation's Micro PanelMate series of products offers unsurpassed capabilities in electronic operator interfaces. Most of the models offer multiple, simultaneous triggers creating a Windows-like display environment. All are designed for use with Cutler-Hammer D50 and D300 PLCs, and most of the models also communicate with other brands of PLCs.

Operator Features

- Large, bright Liquid Crystal Displays (LCD) with LED backlight make these units easy to view.
- Units with membrane keypads offer tactile feedback so that operators receive a physical response for sure and accurate operation.
- Navigation keys, definable function keys, selection and enter keys allow operators to easily step through screens to start, run and monitor their equipment.

Online Operation

- High/low limits for data entry fields eliminate the potential for erroneous data being allowed into the PLC data table.
- An 8-bit scaling value converts values coming from the PLC into operator-recognizable data. Values can be displayed in decimal, binary, hex and ASCII.
- 15 levels of password protection allow for the same pages to be used for both maintenance and operation personnel with access to only the appropriate data.

Simplified Configuration

The configuration software offers an easy way to configure the Micro PanelMate family of products. Its upward/downward compatibility means you don't have to re-invent your application as you move up in features of the different models. The WYSIWYG (What You See Is What You Get) editing and offline verification testing of displays work together for effortless integration.

Features

- Data Tag Reference Editor allows for tags to be created or imported from many PLC programming software packages, reducing application development time.
- Download files from Excel® and Word®, and sort, copy, paste, etc. Once the database has been created, use it for any host driver with simple modifications to references.
- A resident simulator allows you to "dry-run" your entire application saving you "on-the-floor" debug time. No need to have the Micro PanelMate and PLC tied together. Trigger screens, enter data and try your entire application before downloading it.
- A memory usage monitor calculates the total memory consumed by the application after each integrity check. See at a glance the memory available while configuring your application.
- Fly-by prompting with tool tips as you move your cursor over the icons and a dialogue bar along the bottom of the editor software eliminate confusion and make configuration simpler.
- Micro PanelMate security is provided with assignable four-digit combination locks for data access fields.

D830 Micro PanelMate

D830 Micro PanelMate

Product Description

With the capability to view and edit PLC data on the same page, define pushbuttons and selector switches per page, and display two pages simultaneously, the Eaton's Cutler-Hammer D830 changes the definition of a text-based product.

- The 2-line x 20-character display provides operator information. Messages can scroll both vertically and horizontally to provide up to 255 characters of information, without changing screens.
- Four function keys (F1, F2, YES, NO) are re-definable on each page and can be configured as momentary pushbuttons, maintained selector switches, exclusive selector switches or page triggers. Two definable navigation keys (PREV/NEXT) allow for simple "Step Through" operation.
- The 10-digit keypad along with ENTER, SELECT, LOCK and CANCEL keys makes changing production variables simple.
- Meets UL, CSA, CE and UL Class I Division 2 Groups A, B, C, D requirements.

Technical Data

Specifications

- Display type: liquid crystal display with LED backlight.
- Resolution: 2 x 20-character resolution, 5.5 mm characters.
- Number of simultaneous trigger pages: 2.
- Operator entry:
  - ❑ Membrane keypad
  - ❑ 4 navigation
  - ❑ 2 definable function keys
  - ❑ ENTER, SELECTION, LOCK, CANCEL
- Mounting: single-piece construction with captive mounting studs.
- NEMA rating: NEMA 4/4X and 12.
  Note: When properly mounted in a correspondingly rated enclosure.
- Connections: 25-pin D-shell port for connection to PLCs.
- Power supply:
  - ❑ Voltage: 24 Vdc
  - ❑ Consumption: 100 mA
- Dimensions in inches (mm): 5.03 H x 7.98 W x 1.41 D (127.8 x 202.7 x 35.8).
- Ship wt.: 1.5 lbs. (.68 kg).

Product Selection

Table 34.4-10. D830 Micro PanelMate

Description	Catalog Number
Base unit with D50/D300 PLC driver	**D830MPM**

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D840 Micro PanelMate

D840 Micro PanelMate

Product Description

The D840 Micro PanelMate is a highly functional graphical interface at a price associated with text-based units. Push-buttons and selector switches can be assigned custom bitmap images so operators can respond quicker than to text commands. The D840 supports multiple font sizes, dynamic graphics, recipes, and up to 8 variables simultaneously.

Features

- The 128 x 64 display has the capability to display bitmap images such as pushbuttons and switches to enhance operator understanding and response.
- Like the D830, the tactile membrane keypad, navigation, re-definable function, and command keys allow operators a simple way to step through changing production variables.
- Meets UL, CSA, CE and UL Class I Division 2 Groups A, B, C, D requirements.

Technical Data

Specifications

- Display type: liquid crystal display with LED backlight.
- Display size: 1.38 x 2.25-inch (35.1 x 57.2 mm).
- Resolution: 128 x 64 pixel, text and graphics.
- Operator entry: 20 key membrane keypad.
- Mounting: single-piece construction with captive mounting studs.
- NEMA rating: NEMA 4, 4X, 12.
  Note: When properly mounted in a correspondingly rated enclosure.
- Connections: 25 pin D-shell port for connection to PLCs.
- Power supply:
  - Voltage: 24 Vdc
  - Consumption: 150 mA
- Dimensions in inches (mm): 5.03 H x 7.98 W x 1.41 D (127.8 x 202.7 x 35.8)
- Ship wt.: 1.5 lbs. (.68 kg).

Product Selection

Table 34.4-11. D840 Micro PanelMate

Description	Catalog Number
Base unit with D50/D300 PLC driver	**D840MPM**

Micro PanelMate Utilities, Cables and Accessories

Table 34.4-12. Transfer Serial Cable

Description	Catalog Number
For Micro PanelMate (Included in D800CCSSET software packages)	**D800CBLXFR**

Transfer Utility

Windows utility allowing configuration, options and communication interfaces to be uploaded and downloaded between a PC and a unit, but does not permit configuration. Users can transfer configurations while the originator maintains central control **and protection against alterations.**

Table 34.4-13. Transfer Utility

Description	Catalog Number
For Micro PanelMate	**D800XFR**

Table 34.4-14. Allen-Bradley PLC DH-485 Communications Enable Utility

Description	Catalog Number
Communications Enable Utility with DH-485 D800ENABLEDH is required for each D830, D840 or D850 that will use Allen-Bradley SLC500 DH-485 PLC Communications Interface.	**D800ENABLEDH**

Table 34.4-15. Allen-Bradley PLC Communication Cables

Description	Catalog Number
Allen-Bradley SLC 500 DH-485 PLC Cable	**D800CBLAB1**
Allen-Bradley SLC 500 DF1 PLC Cable	**D800CBLAB6**
Allen-Bradley PLC-5 DF1 PLC Cable	**D800CBLAB7**

Table 34.4-16. Cutler-Hammer PLC Communication Cables

Description	Catalog Number
C-H D50/D300 PLC Cable	**D800CBLCH1**

Table 34.4-17. GE Communications Cable

Description	Catalog Number
General Electric® Series 90 PLC Cable	**D800CBLGE2**

Table 34.4-18. Modicon Communication Cables

Description	Catalog Number
Modicon 9-Pin Modbus PLC Cable	**D800CBLMB1**
Modicon Micro PLC Cable	**D800CBLMB2**

Table 34.4-19. Power Supplies

Description	Catalog Number
115 Vac to 24 Vdc Power Conversion Module	**1216**

Micro PanelMate Configuration Software

Product Description

When installed on a Windows-based PC, this software permits access to all configuration operations. The easy, fill-in-the-blanks software provides WYSIWYG (What You See Is What You Get) creation of pages. In addition, you can download pages and PLC communication interfaces, options and completed pages from your personal computer.

A minimum 386-based personal computer with VGA graphics, 4 MB RAM and Windows 3.1 or higher is required to run the configuration software. Twenty megabytes of free hard-disk space is required to load the configuration software with all the PLC communication interfaces and to configure a typical PanelMate Power Series configuration. To fully view configurations, 256 colors are needed. Software is supplied on 3-1/2-inch high density diskettes.

Note: Configuration software can be installed and used on one or more personal computers or on a shared access computer network, so long as all use takes place at no more than one (1) site at any time.

Configuration software can be used to configure an unlimited number of PanelMate units. You only need to buy one package for each series you are using. RS-485/RS-232 Adapter is needed (#D50CPM485).

Product Selection

Table 34.4-20. Windows Configuration Software for Micro PanelMate

Description	Catalog Number
Windows Configuration Software with Communication Software Interfaces for all major PLCs: AB SLC 500 DH-485, PLC-5 DF1, SLC-5/03, 5/04 DF1 AB MicroLogix DF1 GE 90 Series with SNP Protocol Mitsubishi FX Series Modicon Modbus® RTU Omron Host Link Siemens S5 Series Cutler-Hammer D50, D300 ASCII Communications Included in package: D800CBLXFR D800DWNLD D800ENABLE Manuals	**D800CCSSET**

Communication Enable Utility for Micro PanelMate

Table 34.4-21. Communication Enable Utility

Description	Catalog Number
Micro PanelMate Required for each individual D830, D840 or D850 that will use any non-Cutler-Hammer PLC communications interface other than DH-485.	**D800ENABLE**

Note: See D800ENABLEDH on **Page 34.2-1** for DH-485 communication.

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General Application Information

Overview

The enclosure for the PanelMate unit must provide protection against conditions that can shorten the unit's life or cause improper operation:

- Protection from oil, dust, moisture, corrosive vapors and other airborne contaminants.
- Protection from ambient temperatures above or below unit specifications.
- Protection from electromagnetic interference.

Potential Problem Areas

- Enclosure is too small or PanelMate unit is not mounted in a vertical position for efficient convection cooling.
- Heat-generating devices cause internal temperature to rise above the operator interface's ratings.
- Enclosure is mounted near devices generating high levels of magnetic or electrical interference.
- Free air space is not present around the outside of the enclosure. This arrangement prevents the enclosure's metal panels from dissipating internal heat.

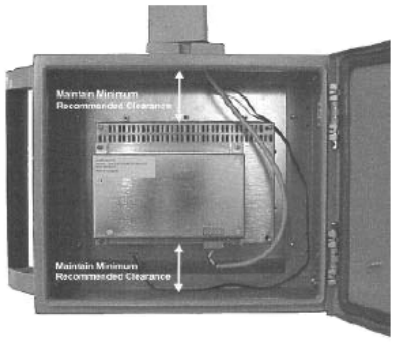
Enclosure Rating

The front panels of PanelMate units provide a Type 4 or Type 12 rating when mounted in a correspondingly rated enclosure. Some PanelMate models are also rated for Type 4X installations. Make sure the enclosure you choose will meet or exceed your application's Type rating requirement.

Enclosure Construction

Eaton recommends an enclosure constructed of cold-rolled steel. This will help guard your unit against electromagnetic interference, as well as provide proper structural support and good heat dissipation.

Enclosure Sizing and Unit Positioning



PanelMate in Enclosure

Careful enclosure sizing is important for proper heat dissipation and easy installation and maintenance. For efficient convection cooling, free space is needed around the PanelMate unit and the unit should be mounted in a vertical position. Convection cooling draws a vertical column of air upward over internal circuitry through the vents in the unit.

In all installations, the cooling air must not exceed the maximum specified ambient temperature.

This determination must be made for the maximum expected plant temperature (maximum temperature of the air surrounding the enclosure).

- Maintain recommended free space above and below the PanelMate unit (see **Table 34.5-1**).
- Avoid mounting other heat-generating equipment near the PanelMate unit. If no other location is available, mount the equipment beside or behind the PanelMate unit. If side/rear space is not available, it is preferable to mount the other equipment above rather than below the PanelMate unit. Be sure to maintain the recommended free space area between the PanelMate unit and the other equipment.
- Leave room for easy access to circuit boards, wiring/cable connections, and regular maintenance.

Recommended Free Space and Maximum Operating Temperature

The free space area is the space between the PanelMate unit's electronics and the top or bottom of the enclosure-internal fans, helping provide a uniform ambient temperature inside the enclosure.

PanelMate

If the inside temperature of the enclosure is above the PanelMate unit's recommended range (see **Table 34.5-1**), you must use filtered fans, heat exchangers, or air conditioners to lower the temperature.

Because hot air rises to the top of an enclosure, the temperature inside can vary greatly from bottom to top. A fan can be used to circulate air within the enclosure to maintain a more uniform temperature. Make sure the magnetic properties of the equipment used to cool the enclosure do not interfere with your PanelMate unit's operation.

Note: If an air-purged enclosure is used, it is recommended that the inside/outside pressure differential not exceed .5 PSI.

Table 34.5-1. Recommended Free Space and Maximum Operating Temperature

PanelMate Model	Maximum Operating Ambient Temperature	Unit Heat Output	Recommended Free Space Inches (mm)
D830	50°C	5.4 BTU/hr (1.5 W)	6.00 (152.4) Minimum
1100 Series	50°C	78 BTU/hr (23 W)	2.00 (50.8) Minimum 4.00 (101.6) Minimum
1700 Series	50°C Grayscale and Color TFT 40°C Color Dual-Scan	78 BTU/hr (23 W) 78 BTU/hr (23 W)	2.00 (50.8) Minimum 4.00 (101.6) Minimum
3000 Series	50°C Color TFT ①	102 BTU/hr (30 W at 24 Vdc) ①	6.00 (152.4) Minimum
	50°C Color TFT ①	119 BTU/hr (35 W at 120 Vac) ①	6.00 (152.4) Minimum
5000 Series	50°C	102 BTU/hr (30 W at 24 Vdc) ①	6.00 (152.4) Minimum
	50°C	137 BTU/hr (40 W at 120 Vac) ①	6.00 (152.4) Minimum
ePro	50°C	116 BTU/hr (34 W at 24 Vdc))	4.00 (101.6) Minimum
ePro ES	50°C	6-Inch – 52 BTU/hr (15 W)	2.00 (50.8) Minimum
ePro PS	55°C ②	8-Inch – 96 BTU/hr (28 W) 12-Inch – 109 BTU/hr (32 W) 15-Inch – 150 BTU/hr (44 W) BN – 68 BTU/hr (20 W)	4.00 (101.6) Minimum

① 3000 Series Color TFT and 5000 Series units are available in 24 Vdc and 120 Vac versions.
② 50°C with optional PCI adapter attached.

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Enclosure Size vs. Average Internal Temperature Rise

Table 34.5-2. makes the following assumptions:

- Enclosure is fabricated from cold-rolled steel.
- All sides of the enclosure are not insulated (freestanding).
- Recommended minimum clearance between the PanelMate unit and the top and bottom of the enclosure.
- No other heat-generating equipment is installed in the enclosure.

Note: The temperature rise shown represents the temperature rise in the enclosure above the outside temperature. For example, if the temperature outside the enclosure is 35°C and the temperature rise in the enclosure is 10°C, then the average temperature inside the enclosure will be 45°C.

The following sizing table is offered as an aid in the selection of enclosures to be used with PanelMate products. Eaton offers no guarantee or warranty to the specific applicability of this table as actual conditions may vary and methods of the use of our products are beyond our control. For specific information about enclosure selection and cooling methods, contact your enclosure vendor.

Table 34.5-2. Suggested PanelMate Enclosure Sizes

Panel Type	Size in Inches (mm)	Temperature Rise (Degrees C)
1100 with Keypad or Touchscreen	16.00 x 16.00 x 4.00 (406.4 x 406.4 x 101.6) 16.00 x 16.00 x 6.00 (406.4 x 406.4 x 152.4) 20.00 x 16.00 x 6.00 (508.0 x 406.4 x 152.4)	10.8°C 9.3°C 7.7°C
1100 with Touchscreen	12.00 x 12.00 x 6.00 (304.8 x 304.8 x 152.4) 12.00 x 14.00 x 6.00 (304.8 x 355.6 x 152.4)	14.4°C 12.8°C
1700 with Keypad or Touchscreen	16.00 x 16.00 x 4.00 (406.4 x 406.4 x 101.6) 16.00 x 16.00 x 6.00 (406.4 x 406.4 x 152.4) 20.00 x 16.00 x 6.00 (508.0 x 406.4 x 152.4)	10.8°C 9.3°C 7.7°C
1700 with Touchscreen	12.00 x 12.00 x 6.00 (304.8 x 304.8 x 152.4) 12.00 x 14.00 x 6.00 (304.8 x 355.6 x 152.4)	14.4°C 12.8°C
All 3000 (24 Vdc)	24.00 x 20.00 x 6.00 (609.6 x 508.8 x 152.4) 24.00 x 24.00 x 6.00 (609.6 x 609.6 x 152.4)	6.7°C 5.3°C
All 3000 (120 Vac)	24.00 x 20.00 x 8.00 (609.6 x 508.8 x 203.2) 24.00 x 24.00 x 8.00 (609.6 x 609.6 x 203.2)	7.2°C 6.7°C
5000 with Keypad (24 Vdc)	30.00 x 24.00 x 8.00 (762.0 x 609.6 x 203.2) 30.00 x 24.00 x 10.00 (762.0 x 609.6 x 254.0)	4.2°C 3.6°C
5000 with Keypad (120 Vac)	30.00 x 24.00 x 8.00 (762.0 x 609.6 x 203.2) 30.00 x 24.00 x 10.00 (762.0 x 609.6 x 254.0)	6.0°C 5.6°C
5000 with Touchscreen (24 Vdc)	24.00 x 24.00 x 8.00 (609.6 x 609.6 x 203.2) 24.00 x 24.00 x 10.00 (609.6 x 609.6 x 254.0) 24.00 x 30.00 x 8.00 (609.6 x 762.0 x 203.2)	5.3°C 4.8°C 4.2°C
5000 with Touchscreen (120 Vac)	24.00 x 24.00 x 8.00 (609.6 x 609.6 x 203.2) 24.00 x 24.00 x 10.00 (609.6 x 609.6 x 254.0) 24.00 x 30.00 x 8.00 (609.6 x 762.0 x 203.2)	7.2°C 6.7°C 6.1°C
ePro	16.00 x 16.00 x 8.00 (406.4 x 406.4 x 203.2) 20.00 x 16.00 x 8.00 (508.0 x 406.4 x 203.2) 20.00 x 16.00 x 10.00 (508.0 x 406.4 x 254.0)	13.0°C 11.0°C 9.5°C
	20.00 x 20.00 x 10.00 (508.0 x 508.0 x 254.0) 24.00 x 20.00 x 10.00 (609.6 x 508.0 x 254.0) 24.00 x 24.00 x 10.00 (609.6 x 609.6 x 254.0)	7.5°C 6.0°C 6.0°C
ePro ES 6-Inch	10.00 x 10.00 x 4.00 (254.0 x 254.0 x 101.6) 12.00 x 12.00 x 4.00 (304.8 x 304.8 x 101.6) 12.00 x 12.00 x 6.00 (304.8 x 304.8 x 152.4) 12.00 x 16.00 x 6.00 (304.8 x 406.4 x 152.4) 16.00 x 16.00 x 6.00 (406.4 x 406.4 x 152.4)	17.0°C 11.0°C 8.5°C 8.0°C 7.0°C
ePro PS 8-Inch	16.00 x 20.00 x 6.00 (406.4 x 508.0 x 152.4) 20.00 x 20.00 x 6.00 (508.0 x 508.0 x 152.4) 20.00 x 24.00 x 6.00 (508.0 x 609.6 x 152.4) 20.00 x 24.00 x 8.00 (508.0 x 609.6 x 203.2)	10.5°C 8.0°C 7.0°C 5.5°C
ePro PS 12-Inch	20.00 x 20.00 x 6.00 (508.0 x 508.0 x 152.4) 20.00 x 24.00 x 6.00 (508.0 x 609.6 x 152.4) 20.00 x 20.00 x 8.00 (508.0 x 508.0 x 203.2) 20.00 x 24.00 x 8.00 (508.0 x 609.6 x 203.2)	9.0°C 8.0°C 8.0°C 7.0°C
ePro PS 15-Inch	20.00 x 24.00 x 6.00 (508.0 x 609.6 x 152.4) 20.00 x 20.00 x 8.00 (508.0 x 508.0 x 203.2) 20.00 x 24.00 x 8.00 (508.0 x 609.6 x 203.2) 24.00 x 24.00 x 8.00 (609.6 x 609.6 x 203.2)	11.0°C 11.0°C 9.0°C 8.0°C
ePro PS Blind Node	16.00 x 20.00 x 4.00 (406.4 x 508.0 x 101.6) 16.00 x 20.00 x 6.00 (406.4 x 508.0 x 152.4) 20.00 x 20.00 x 6.00 (508.0 x 508.0 x 152.4) 20.00 x 24.00 x 6.00 (508.0 x 609.6 x 152.4)	9.0°C 7.0°C 5.5°C 5.0°C

Communication Overview

This section contains a summary of several popular communication interface options. Each summary provides specific recommendations, guidelines and installation tips.

Potential Problem Areas

Improper grounding of communications cable, causing excessive radiated emissions.

- Incorrect cable or pin-out, improper or lack of termination on PanelMate units located at the end of a communications network.
- Failure to maintain minimum/maximum cable lengths between nodes on a communications network.
- Exceeding recommended cable or total network distance.

A variety of communication interface options are available for PanelMate products.

Options include:

- RS-232 and RS-422 based communications.
- RS-485 multi-drop communications.
- "Open" multi-drop networks (examples: DeviceNet, PROFIBUS).
- Proprietary PLC networks (examples: Allen-Bradley Data Highway, GE Fanuc Genius I/O, Modicon Modbus Plus).

Eaton does not recommend any specific communications option. Your choice should be based on the requirements of your total control system. The communications option you choose determines the precautions you need to take when installing and connecting your PanelMate unit.

For easy reference, this chapter contains a summary of several popular communication interface options. Each summary provides specific recommendations, guidelines and installation tips.

Note: Low signal level conductors (Category 2) have a low tolerance for induced electrical noise. Electrical noise can cause a wide range of communications problems resulting in slow or error-prone PanelMate operation. Be certain to follow all of the installation recommendations for the communication option you choose. Also, be sure to follow good wiring placement practices as outlined in "Cable Segregation and Placement."

Communication Interface Options

RS-232 Communications

- Recommended distance:
  - Up to 50 feet (15.2 m)
- Recommended cable type/size:
  - 24 gauge, shielded pair

RS-232 Grounding Recommendations

Grounding of the communication cable shield at both ends will provide the most immunity to high frequency electrical interference. However, the introduction of low frequency interference by high ground currents in the shield may require grounding only one end. Should this approach result in unacceptable high frequency interference, then an RS-422 interface should be considered. For RS-232 communications, the maximum rated input voltage at the PanelMate unit's serial port is –30 to +30 volts.

RS-232 Shielding Recommendations

Application: Short or Long Runs in LOW or HIGH Noise Environment with INSIGNIFICANT Levels of Low Frequency Ground Differential Voltage Between Connected Units

A good quality shielded cable consisting of twisted pairs for the required communication wires and logic common is recommended. An unshielded line is not recommended because the unshielded connectors may act as an antenna resulting in radiated emissions that may exceed the CE required limit. Additionally, shielded cable provides greater ESD protection. The shield should be connected directly to the chassis of the interconnected units at both ends. The connector housing should contact the cable shield uniformly around the entire 360-degree periphery of the housing cable entry opening. Never connect the shield by way of a drain wire pigtail unless absolutely necessary. If a pigtail is required, the shield should be terminated as close as possible to the connector to minimize the pigtail length.

Application: Short or Long Runs in LOW Noise Environment with HIGH Levels of Low Frequency Ground Differential Voltage Between Connected Units

A good quality shielded cable consisting of twisted pairs for the required communication wires and logic common is recommended. The shield should be connected directly to the chassis of one of the interconnected units (one end only). Never connect the shield by way of a drain wire pigtail unless absolutely necessary. If a pigtail is required, the shield should be terminated as close as possible to the connector to minimize the pigtail length.

Application: Short or Long Runs in HIGH Noise Environment with HIGH Levels of Low Frequency Ground Differential Voltage Between Connected Units

A good quality shielded cable consisting of twisted pairs for the required communication wires and logic common is recommended. The shield should be connected directly to the chassis of one of the interconnected units and ac-coupled through a 0.01 µf capacitor at the other end to the chassis of the second unit. The connector housing should contact the cable shield uniformly around the entire 360-degree periphery of the housing cable entry opening. Attaching the capacitor at the ac-coupled end will require some ingenuity to achieve a secure connection at both the shield and chassis while keeping the capacitor lead length as short as possible.

RS-422 Communications

- Recommended distance:
  - Up to 4000 ft. (1219.2 m)
  - Up to 2000 ft. (609.6 m) for RS-422 connected to A-B Channel 0
- Recommended cable type/size:
  - 22 gauge, shielded pair

RS-422 Grounding Recommendations

This balanced interface will operate with common mode dc or peak ac voltage differentials of –7 to +7 volts between grounds at each end of the cable. In cases where the common mode voltage approaches either extreme, the system may operate properly when the shield is grounded at only one end of the cable. However, this arrangement will make the system susceptible to high frequency interference. If the systems will not operate properly due to high frequency interference and grounding the cable shield at both ends is ineffective, then total isolation must be considered or eliminate ground potentials in your plant.

RS-422 Shielding Recommendations

Application: Short or Long Runs in LOW or HIGH Noise Environment with INSIGNIFICANT Levels of Low Frequency Ground Differential Voltage Between Connected Units

A good quality shielded cable consisting of twisted pairs for the required communication wires and logic common is recommended. An unshielded line is not recommended because the unshielded connectors may act as an antenna resulting in radiated emissions that may exceed the CE mark required limit. Additionally, shielded cable provides greater ESD protection. The shield should be connected directly to the chassis of the interconnected units at both ends. The connector housing should contact the cable shield uniformly around the entire 360-degree periphery of the housing cable entry opening. Never connect the shield by way of a drain wire pigtail unless absolutely necessary. If a pigtail is required, the shield should be terminated as close as possible to the connector to minimize the pigtail length.

Application: Short or Long Runs in LOW Noise Environment with HIGH Levels of Low Frequency Ground Differential Voltage Between Connected Units

A good quality shielded cable consisting of twisted pairs for the required communication wires and logic common is recommended. The shield should be connected directly to the chassis of one of the interconnected units (one end only). Never connect the shield by way of a drain wire pigtail unless absolutely necessary. If a pigtail is required, the shield should be terminated as close as possible to the connector to minimize the pigtail length.

Application: Short or Long Runs in HIGH Noise Environment with HIGH Levels of Low Frequency Ground Differential Voltage Between Connected Units

A good quality shielded cable consisting of twisted pairs for the required communication wires and logic common is recommended. The shield should be connected directly to the chassis of one of the interconnected units and ac coupled through a 0.01 µf capacitor at the other end to the chassis of the second unit. The connector housing should contact the cable shield uniformly around the entire 360-degree periphery of the housing cable entry opening. Attaching the capacitor at the ac-coupled end will require some ingenuity to achieve a secure connection at both the shield and chassis while keeping the capacitor lead length as short as possible.

RS-485 Multi-drop Communications:

- Recommended distance:
  - Up to 4000 ft. (1219.2 m)
  - Up to 2000 ft. (609.6 m) for RS-485 connected to A-B Channel 0
- Recommended cable type/size:
  - 22 gauge, shielded pair

Note: See separate for Allen-Bradley DH-485 Communications.

This network is an extension of RS-422 and is used for the distribution of data between multiple system components and peripherals over distances up to 4000 ft. (1219.2 m). This system will tolerate common mode voltage differentials from –7 to +12 volts. For more information refer to the EIA RS-485 Standard.

RS-485 Shielding Recommendations

Application: Short or Long Runs in LOW or HIGH Noise Environment with INSIGNIFICANT Levels of Low Frequency Ground Differential Voltage Between Connected Units

A good quality shielded cable consisting of twisted pairs for the required communication wires and logic common is recommended. An unshielded line is not recommended because the unshielded connectors may act as an antenna resulting in radiated emissions that may exceed the CE mark required limit. Additionally, shielded cable provides greater ESD protection. The shield should be connected directly to the chassis of the interconnected units at both ends. The connector housing should contact the cable shield uniformly around the entire 360-degree periphery of the housing cable entry opening. Never connect the shield by way of a drain wire pigtail unless absolutely necessary. If a pigtail is required, the shield should be terminated as close as possible to the connector to minimize the pigtail length.

Application: Short or Long Runs in LOW Noise Environment with HIGH Levels of Low Frequency Ground Differential Voltage Between Connected Units

A good quality shielded cable consisting of twisted pairs for the required communication wires and logic common is recommended. The shield should be connected directly to the chassis of one of the interconnected units (one end only). Never connect the shield by way of a drain wire pigtail unless absolutely necessary. If a pigtail is required, the shield should be terminated as close as possible to the connector to minimize the pigtail length.

Application: Short or Long Runs in HIGH Noise Environment with HIGH Levels of Low Frequency Ground Differential Voltage Between Connected Units

A good quality shielded cable consisting of twisted pairs for the required communication wires and logic common is recommended. The shield should be connected directly to the chassis of one of the interconnected units and ac coupled through a 0.01 µf capacitor at the other end to the chassis of the second unit. The connector housing should contact the cable shield uniformly around the entire 360-degree periphery of the housing cable entry opening. Attaching the capacitor at the ac-coupled end will require some ingenuity to achieve a secure connection at both the shield and chassis while keeping the capacitor lead length as short as possible.

Allen-Bradley DH-485 Communications

- Recommended distance:
  - Up to 4000 ft. (1219.2 m)
- Recommended cable type/size:
  - Belden 9842 cable

Refer to your *Allen-Bradley Cable Installation Manual* for detailed information. The following tips are useful when installing a PanelMate on A-B DH-485 communication networks:

Tip #1: All PanelMate units on the A-B DH-485 communications network should have optical isolation to prevent serial port damage. If the PanelMate model you are installing DOES NOT have built-in optical isolation, then an Allen-Bradley AIC module should be used to provide optical isolation.

Tip #2: Verify the network is terminated. Both ends of a DH-485 network must contain termination resistors. PanelMate Power Series/Power Pro units have built-in termination resistors that can be activated if needed.

Allen-Bradley Data Highway/Data Highway Plus Communications

- Recommended distance:
  - Up to 10,000 ft. (3048 m) at 57.6K baud
  - Shorter lengths at higher baud rates
- Recommended cable type/size:
  - Belden 9463 "blue hose" twin axial cable

Data Highway and Data Highway Plus are proprietary communication networks of Allen-Bradley. Generally, the structure and components of the two networks are the same, but there are differences in communications protocols. Refer to your *Allen-Bradley Cable Installation Manual* for detailed information.

The following tips are useful when installing a PanelMate on A-B Data Highway and Data Highway Plus communication networks:

Tip #1: Verify the network is terminated. Both ends of an A-B Data Highway/Data Highway Plus network must contain termination resistors. Resistor value is determined by the network baud rate. The resistor value must be the same at both ends of the network:

- For 57.6K or 115.2K baud use 150 or 82.5 ohms.
- For 230.4K baud use 82.5 ohms.

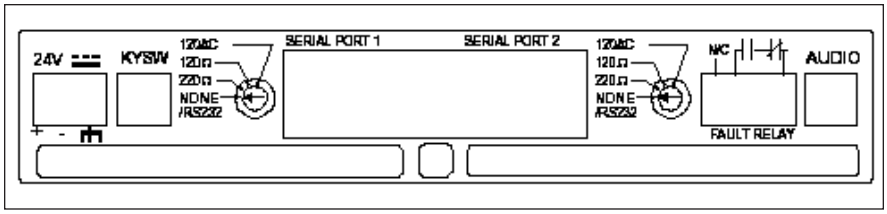

Figure 34.5-1. Allen-Bradley DH-485 Communications.
Note: All 120 Vac PanelMate Power Series Models. Jumpers on the processor board terminate the serial port. Jumper "JP1" for serial port 1 must be set in position A for 120 ohm termination.

Tip #2: The minimum cable length is 20 ft. (6.1 m) between any two nodes.

Tip #3: On Data Highway Plus networks, daisy-chained networks are preferred, but trunkline/dropline is acceptable. Star or tree configurations are NOT acceptable.

Tip #4: In order to comply with CE mark requirements, ferrite cores must be installed on the PanelMate unit's Accelerate/On cable. Steward number 28B0735-000 is recommended. Refer to Cutler-Hammer PanelMate Accelerate/On Interface Installation I.L. for installation details.

Allen-Bradley Remote I/O Link Communications

- Recommended distance:
  - Up to 10,000 ft. (3048 m) at 57.6K baud
  - Shorter lengths at higher baud rates
- Recommended cable type/size:
  - PVC Twinaxial cable.

The Remote I/O Link is a proprietary communication network of Allen-Bradley. The following tips are useful when installing a PanelMate on Remote I/O Link networks:

Tip #1: Verify the network is terminated. Both ends of an A-B Remote I/O Link network must be terminated. Resistor value is determined by the network baud rate. The resistor value must be the same at both ends of the network:

- For 57.6K or 115.2K baud, use 150 or 82.5 ohms.
- For 230.4K baud, use 82.5 ohms.

Tip #2: On Remote I/O networks, daisy chained networks are preferred, but Trunkline/dropline is acceptable. Star or tree configurations are NOT acceptable.

Tip #3: All devices connected to the Remote I/O Link must communicate at the same baud rate.

GE Fanuc Genius I/O Communications

- Recommended distance:
  - Up to 7500 ft. (2286 m) at 38.4K baud
  - Shorter lengths at higher baud rates
- Recommended cable type/size:
  - Refer to your *GE Fanuc Automation Genius I/O Systems and Communications User's Manual*

This proprietary communications network uses twisted pair shielded cable and/or fiber optics cable. For detailed installation instructions refer to the *GE Fanuc Automation Genius I/O Systems and Communications User's Manual*. The following tips are useful when installing a PanelMate on Genius I/O communication networks:

Tip #1: If the PanelMate unit is located at an end of the network, termination is required. The termination resistor value is dependent on the type of cable used. Consult your Genius I/O manual for exact requirements.

Tip #2: Cable type, baud rate and cable length must all be compatible and determine the maximum number of nodes allowed on the network.

Tip #3: Shield Out and Shield In connections must be daisy chained, with the first device's Shield In terminal and the last device's Shield Out terminal left unconnected.

Tip #4: In high electrical noise installations, 153.6K baud provides better noise immunity.

Modicon Modbus Plus Communications

- Recommended distance:
  - Up to 7500 ft. (2286 m) at 38.4K baud
  - Shorter lengths at higher baud rates
- Recommended cable type/size:
  - Refer to your *Modicon Modbus Plus Network Planning and Installation Guide*

This proprietary communications network consists of twisted pair shielded cable extending up to 1500 ft. (457.2 m) with up to 32 nodes. For detailed installation instructions refer to your *Modicon Modbus Plus Network Planning and Installation Guide*. The following tips are useful when installing a PanelMate on Modicon Modbus Plus communication networks:

Tip #1: Trunkline/dropline is the only acceptable network configuration. Star or tree configurations are NOT acceptable.

Tip #2: A drop cable is used to connect the PanelMate unit to the trunkline tap. The drop cable is equipped with a ground lug that must be connected to PanelMate unit's panel ground.

Tip #3: The minimum cable length between nodes must be at least 10 ft. (3 m).

DeviceNet Communications

- Recommended distance:
  - Up to 1640 ft. (499.9 m) at 125K baud
- Recommended cable type/size:
  - Refer to your *Cutler-Hammer DeviceNet Installation Guide*

DeviceNet is a non-proprietary communications network consisting of 5 conductor, shielded cable in trunkline (thick) and dropline (thin) styles. Up to 64 nodes can be installed on the network. Refer to Eaton's *Cutler-Hammer's DeviceNet Planning and Installation Guide* for detailed information on DeviceNet networks. The following tips are useful when installing a PanelMate on a DeviceNet communication network:

Tip #1: The dropline to the PanelMate unit must not exceed 20 ft. (6.1 m).

Tip #2: If the PanelMate unit is the last node on the network, termination is required. Install a 120 ohm terminator in the unused plug of the connector, or install a 120 ohm resistor between pins 4 and 2 of the Phoenix® connector.

Tip #3: The PanelMate unit does not draw power from, or supply power to the network. It is not necessary to make the V+ connection, but you should do so to secure the wires and prevent shorting.

Tip #4: In all PanelMate units, the DeviceNet signal ground is isolated from chassis ground. In locations where problems are caused by high electrical noise, you can change the jumper setting on the PanelMate unit's DeviceNet communications card to connect signal ground to chassis ground.

Refer to Eaton's *Cutler-Hammer's PanelMate DeviceNet Interface Installation I.L.* for detailed jumper information.

Tip #5: In order to comply with CE mark requirements, ferrite cores must be installed on the PanelMate unit's drop line. Steward number 28B1020-100 is recommended for thick line installations. Steward number 28B0735-000 is recommended for thin line installations.

Refer to Eaton's *Cutler-Hammer's PanelMate DeviceNet Interface Installation I.L.* for installation details.

PROFIBUS DP Communications

- Recommended distance:
  - Up to 3278 ft. (999.1 m) at 93.7K baud
- Recommended cable type/size:
  - 22 gauge, shielded pair

PROFIBUS DP is based on RS-485 network technology. A PROFIBUS DP network may have up to 126 nodes, but maximum length of the network is determined by baud rate.

PROFIBUS DP Shielding Recommendations

A good quality shielded cable consisting of twisted pairs for the required communication wires and logic common is recommended. An unshielded line is not recommended because the unshielded connectors may act as an antenna resulting in radiated emissions that may exceed the CE mark required limit. Additionally, shielded cable provides greater ESD protection. The shield should be connected directly to the chassis of the interconnected units at both ends. The connector housing should contact the cable shield uniformly around the entire 360-degree periphery of the housing cable entry opening. Never connect the shield by way of a drain wire pigtail unless absolutely necessary. If a pigtail is required, the shield should be terminated as close as possible to the connector to minimize the pigtail length.

Using PanelMate on a PROFIBUS DP Network

The following tips are useful when installing a PanelMate on a PROFIBUS DP communication network:

Tip #1: The PROFIBUS network must be terminated at both ends of every segment. The termination must be powered at all times.

Tip #2: As the PROFIBUS DP network allows daisy-chained connections, wiring for Signal A and Signal B must remain consistent throughout the segment. It is suggested that the green wire is used for Signal A and the red wire is used for Signal B.

Cable Segregation

The low power cabling used for PLC and PC-based control systems is very susceptible to electrical noise generated by high power conductors. Even when protected by conduit, noise can interfere with your communication lines and networks. Therefore it is important to segregate conductors according to their type.

Category Description Examples

Category 1 High Power Conductors — These conductors can cause electrical noise in Category 2 conductors when in close proximity. Are more tolerant of electrical noise than Category 2. Reference: NEC® article 725 Class I. Reference IEEE level 3 and 4 ac power lines.

High Power Digital ac and dc Lines — Typically these conductors are used to connect hard-contact switches, relays, solenoids, motors, generators and arc welders.

Category 2 Low Signal Level Conductors — These conductors are less tolerant of electrical noise, however, they cause less noise in adjacent conductors. Reference NEC Article 725 Class 2, Class 3. Reference IEEE level 1 and level 2 Communication cables — Ethernet, PLC networks, etc.

Low Power Digital ac and dc I/O Lines — Typically these conductors are used to connect PLCs and related modules with PanelMate operator stations.

Cable Placement

The following guidelines should be used when installing your communication cables:

- All Category 2 cables should be shielded and routed in a separate conduit or raceway from Category 1 cables.
- Route Category 2 cables at least 1 ft. (.3 m) from 120 Vac power lines.
- Route Category 2 cables at least 2 ft. (.6 m) from 240 Vac power lines.
- Route Category 2 cables at least 3 ft. (.9 m) from 480 Vac power lines.
- Route Category 2 cables at least 5 ft. (1.5 m) from high voltage enclosures.
- If a Category 2 cable must cross Category 1 cables, it should cross at a right angle.
- If Category 2 cable is enclosed in metal conduit or a metal raceway, electrical continuity must be maintained along the entire length of the conduit/raceway installation, including entry into the enclosure.

PanelMate Unit — Dimensions in Inches (mm)

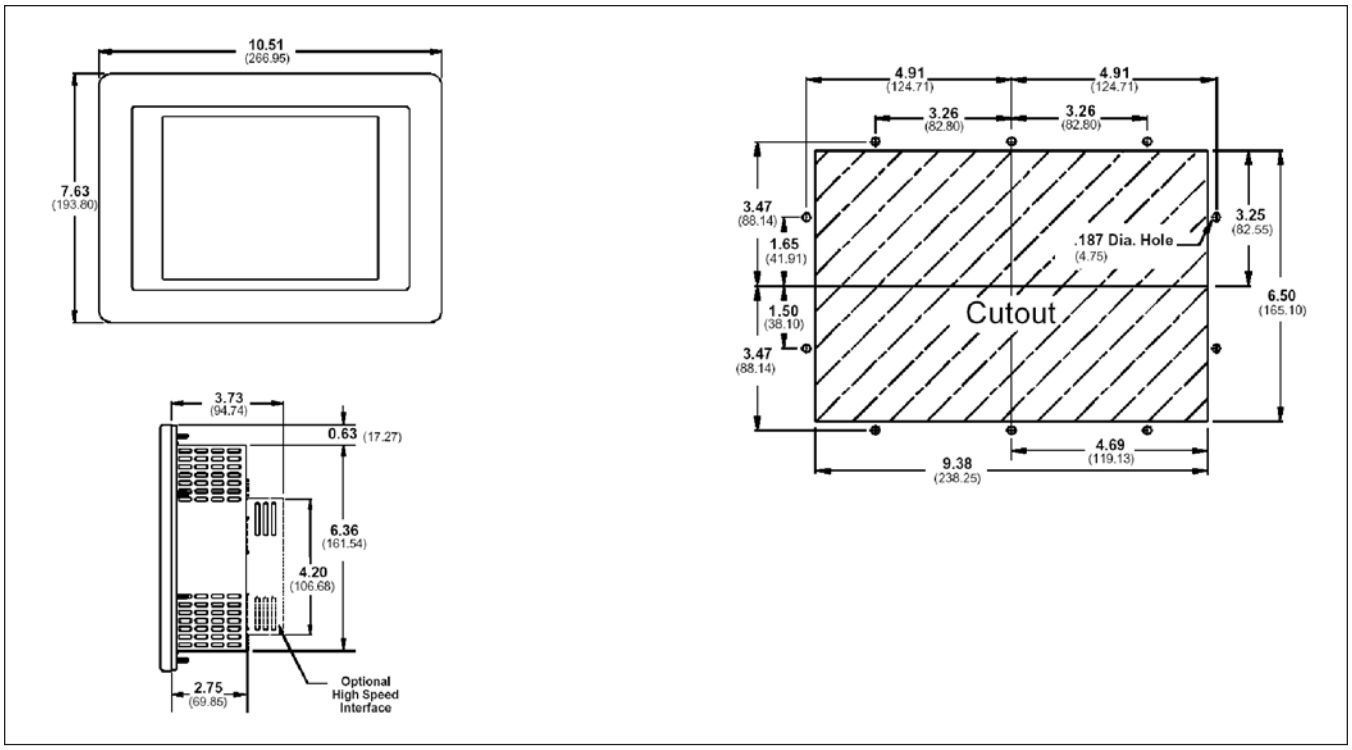

Figure 34.5-2. PanelMate Pro LT 1100 and PanelMate Power Pro 1700 Touchscreen

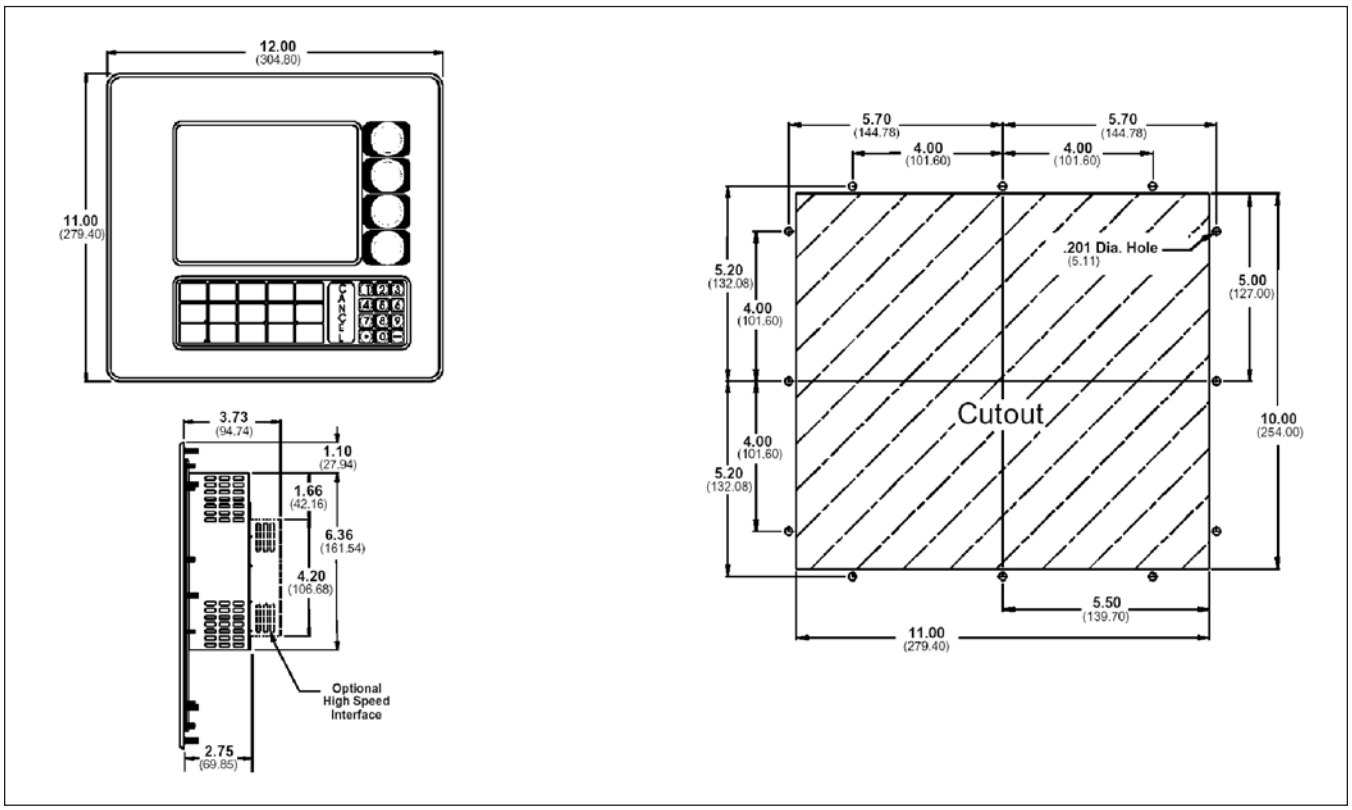

Figure 34.5-3. PanelMate Pro LT 1100 and PanelMate Power Pro 1700 TouchPanel (Keyboard)

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PanelMate Unit — Dimensions in Inches (mm) (Continued)

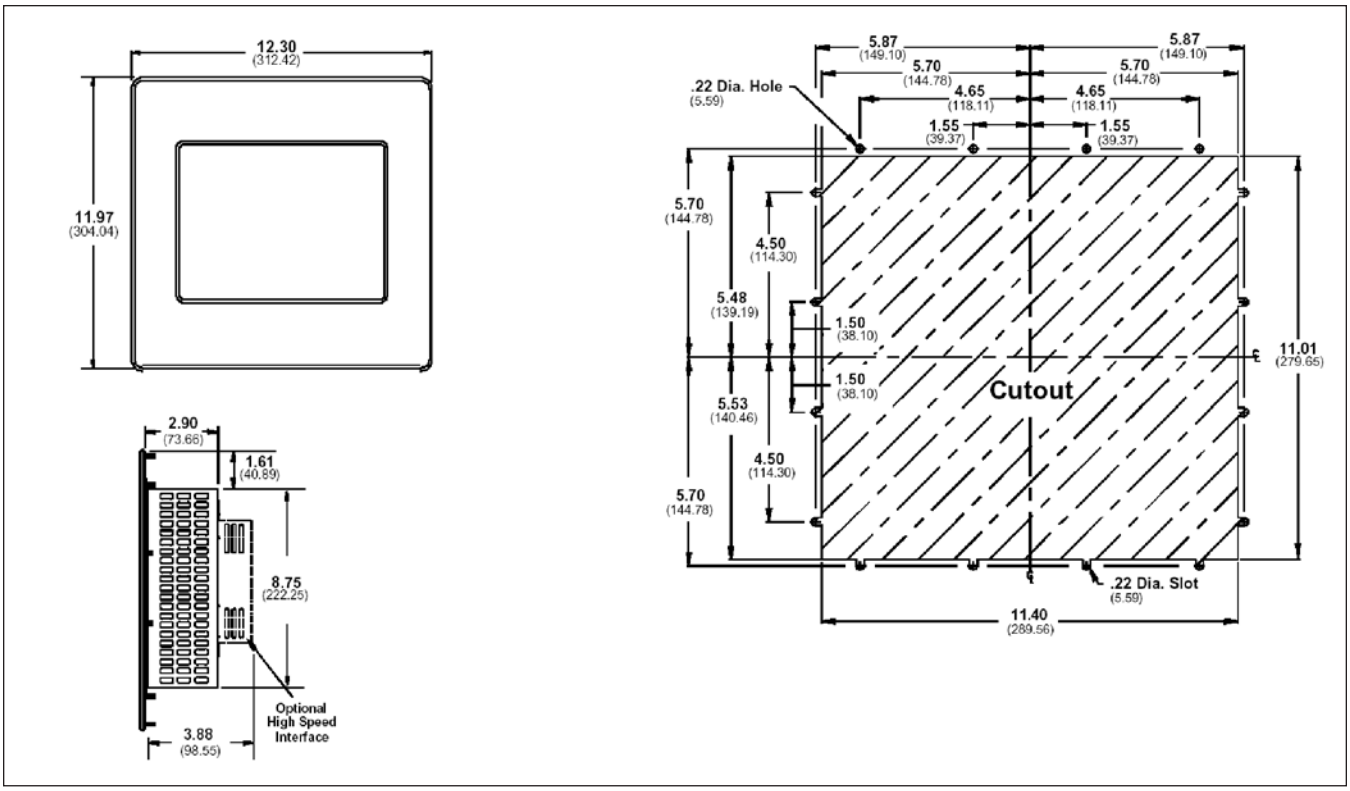

Figure 34.5-4. PanelMate Power Pro 3000 Touchscreen

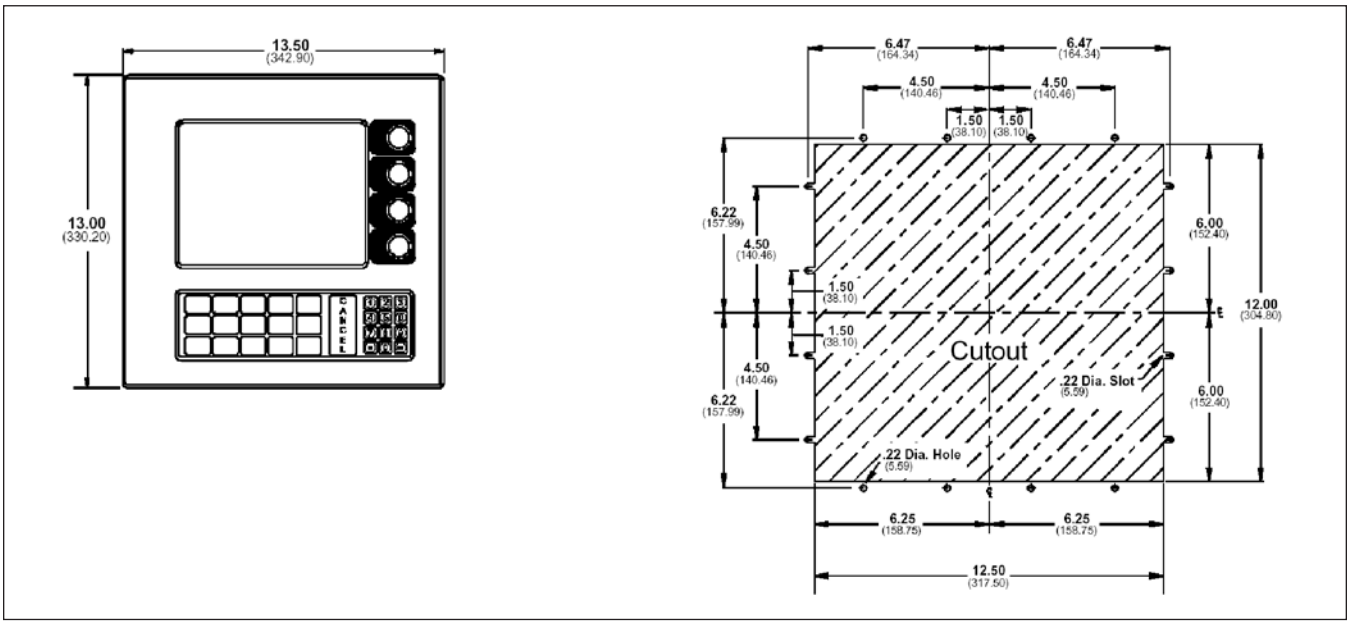

Figure 34.5-5. PanelMate Power Pro 3000 TouchPanel (Keyboard)

PanelMate Unit — Dimensions in Inches (mm) (Continued)

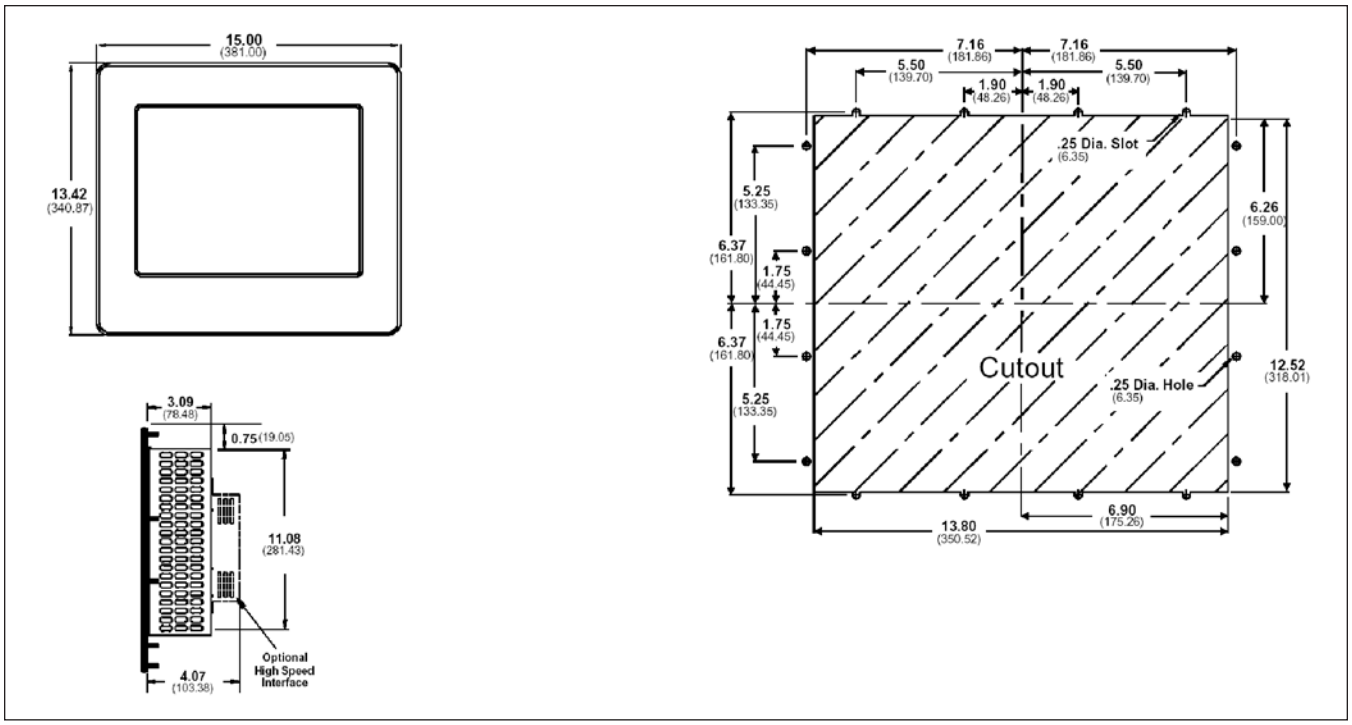

Figure 34.5-6. PanelMate Power Pro 5000 Touchscreen

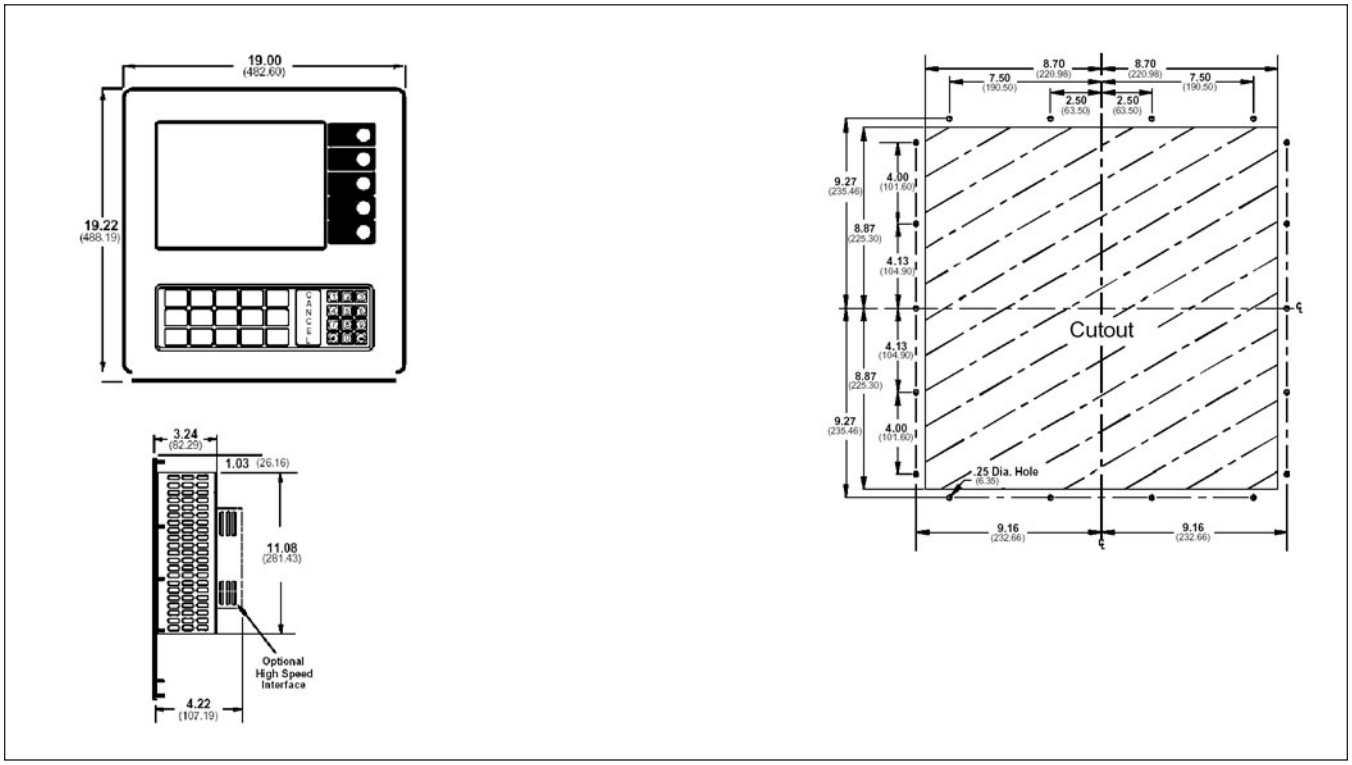

Figure 34.5-7. PanelMate Power Pro 5000 TouchPanel (Keyboard)

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PanelMate Unit — Dimensions in Inches (mm) (Continued)

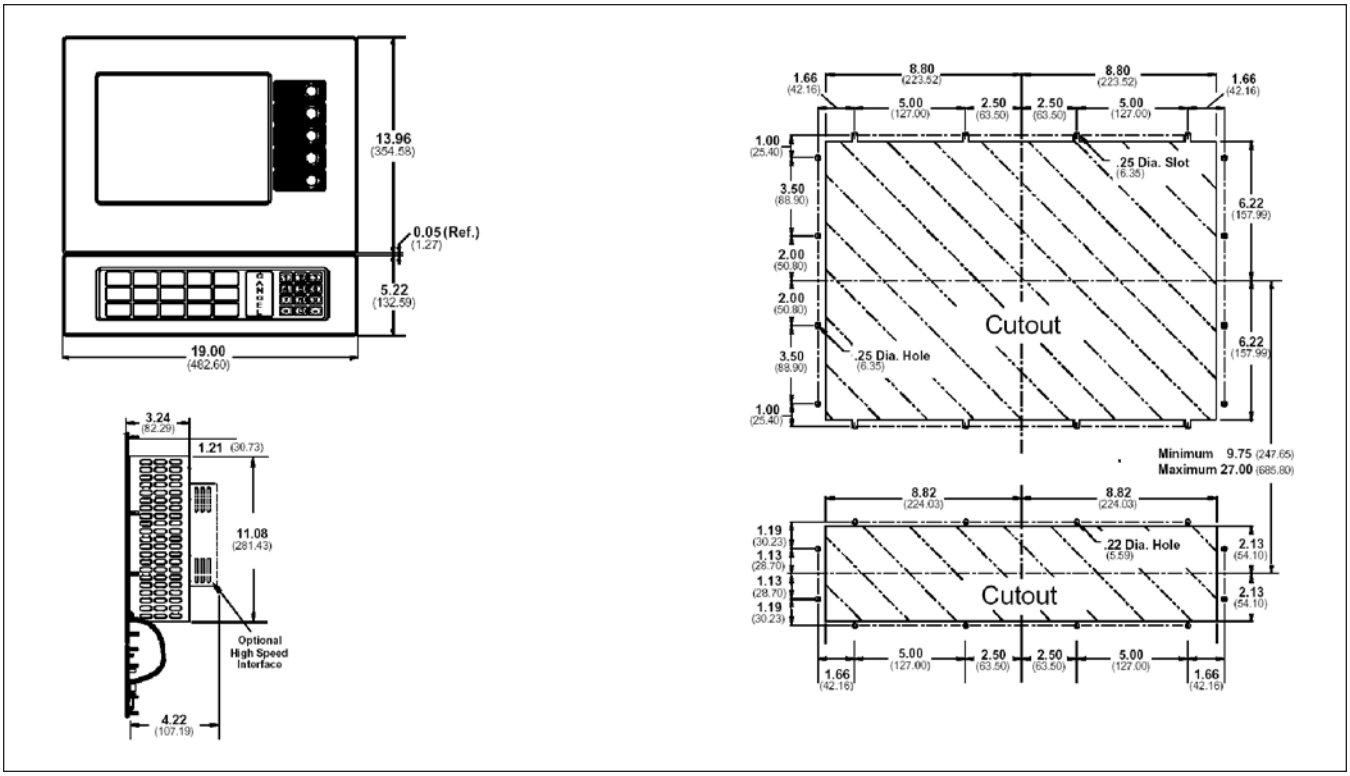

Figure 34.5-8. PanelMate Power Pro 5000 TouchPanel (Keyboard) Split Architecture

Micro PanelMate Unit — Dimensions in Inches (mm)

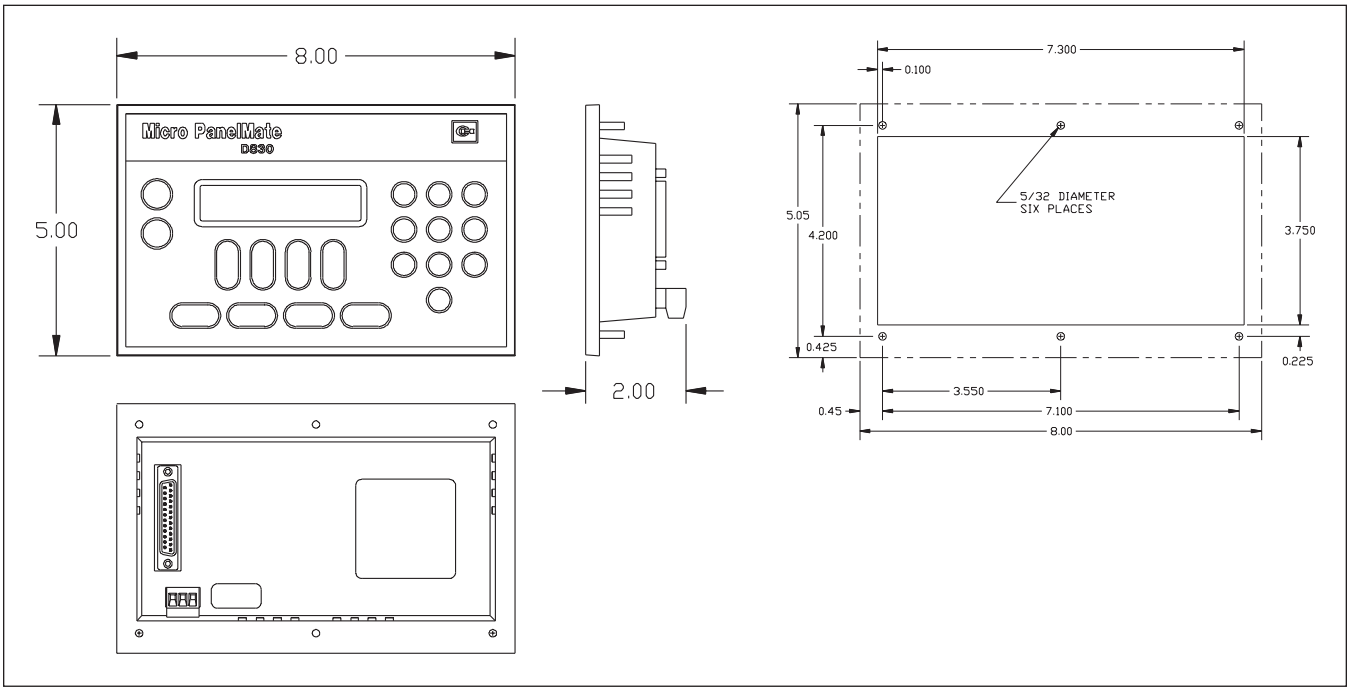

Figure 34.5-9. Micro PanelMate D830/D840

PanelMate ePro Unit — Dimensions in Inches (mm)

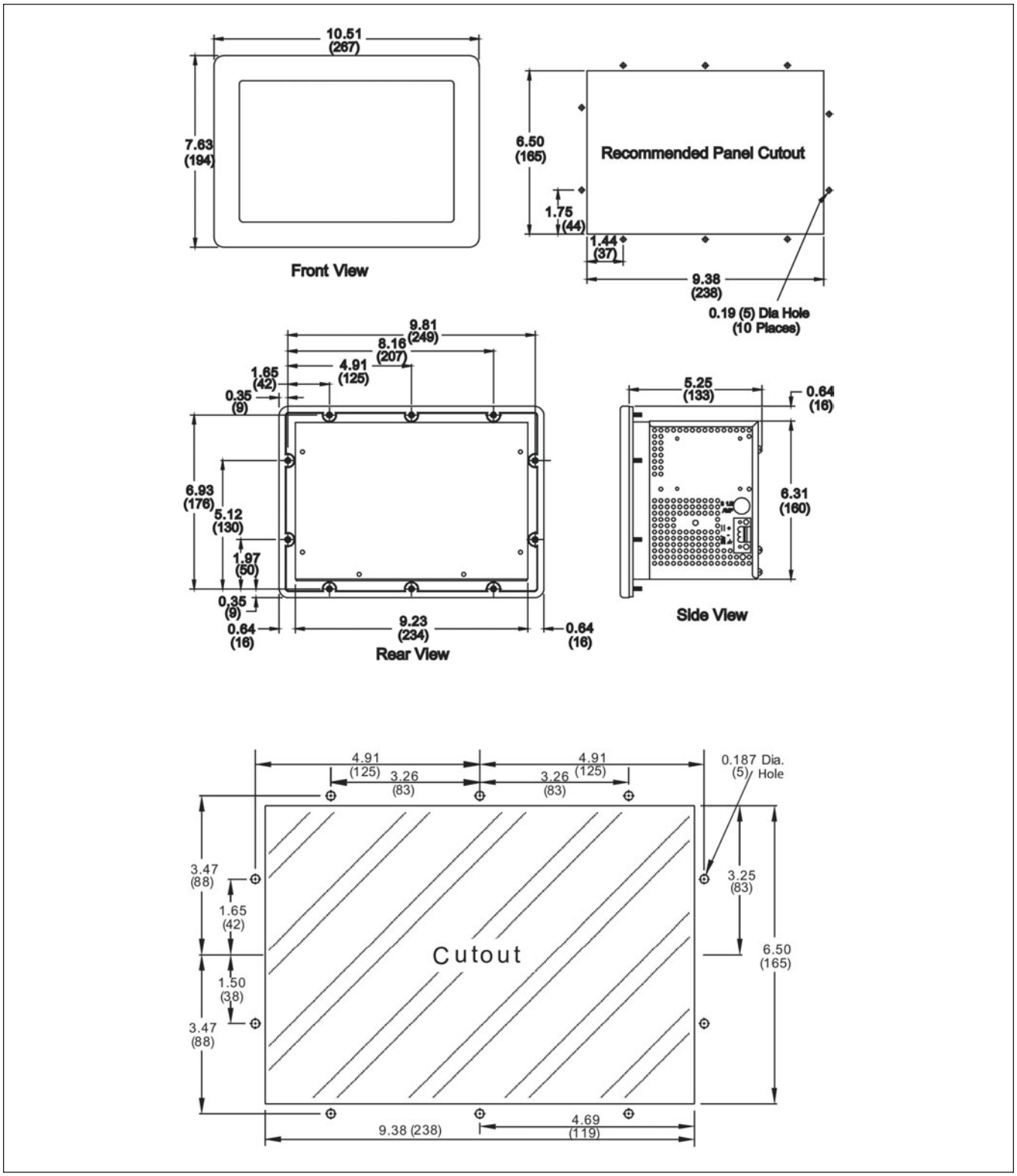

Figure 34.5-10. PanelMate ePro 7575T-8 and 7585T-8 Series

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PanelMate ePro Unit — Dimensions in Inches (mm) (Continued)

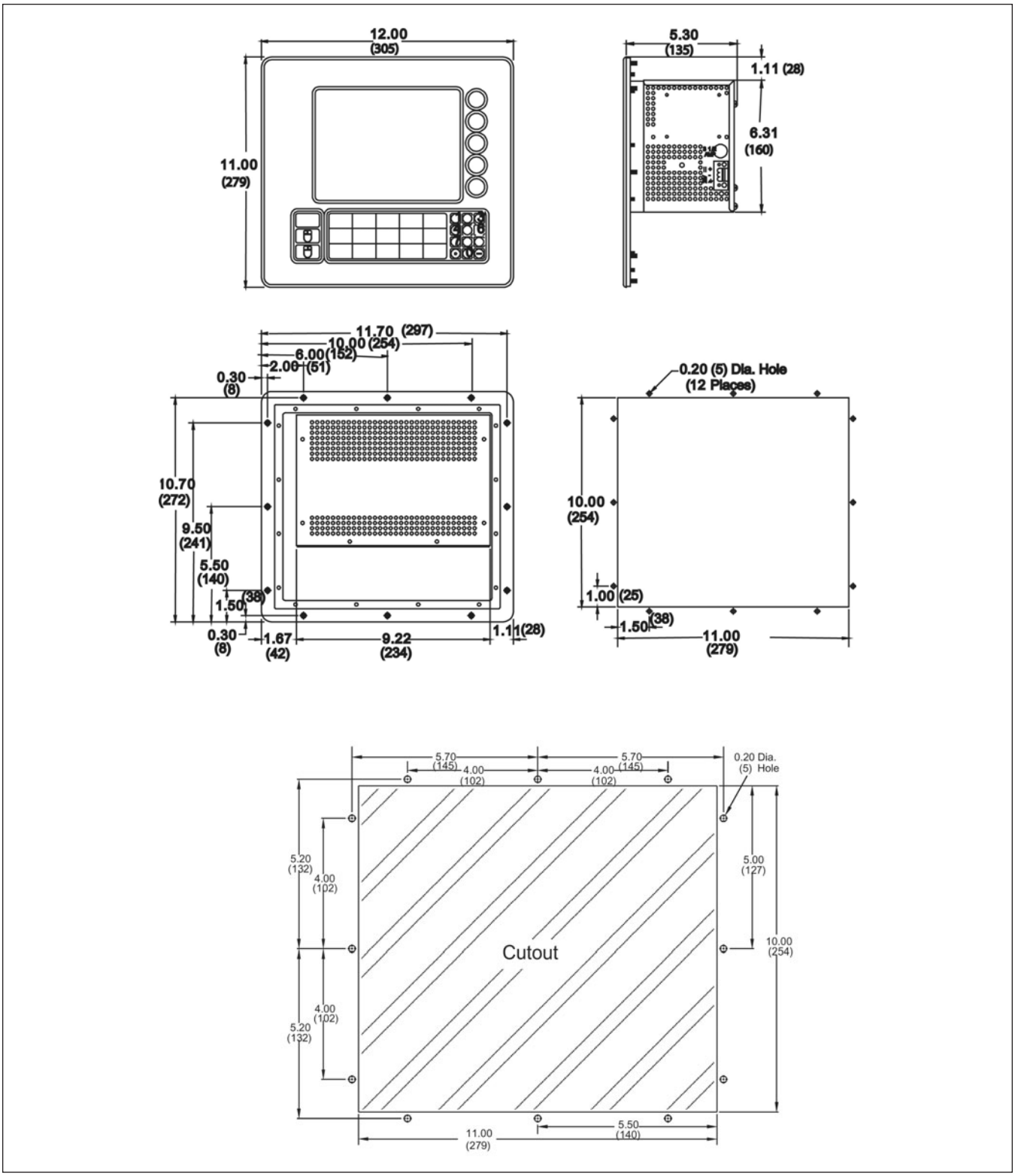

Figure 34.5-11. PanelMate ePro 7585K-8 Series

PanelMate ePro Unit — Dimensions in Inches (mm) (Continued)

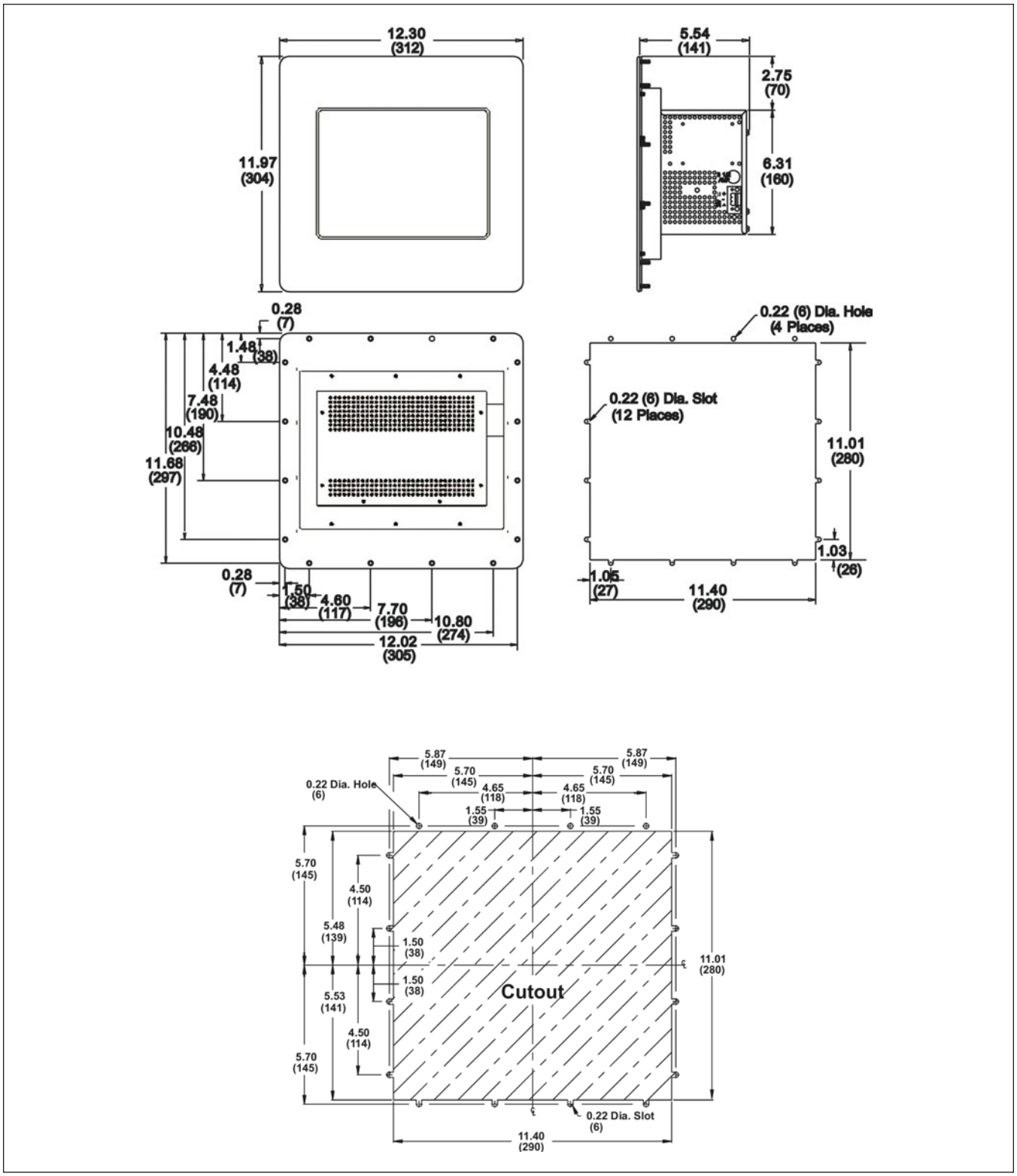

Figure 34.5-12. PanelMate ePro 7585T-10 Series

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PanelMate ePro Unit — Dimensions in Inches (mm) (Continued)

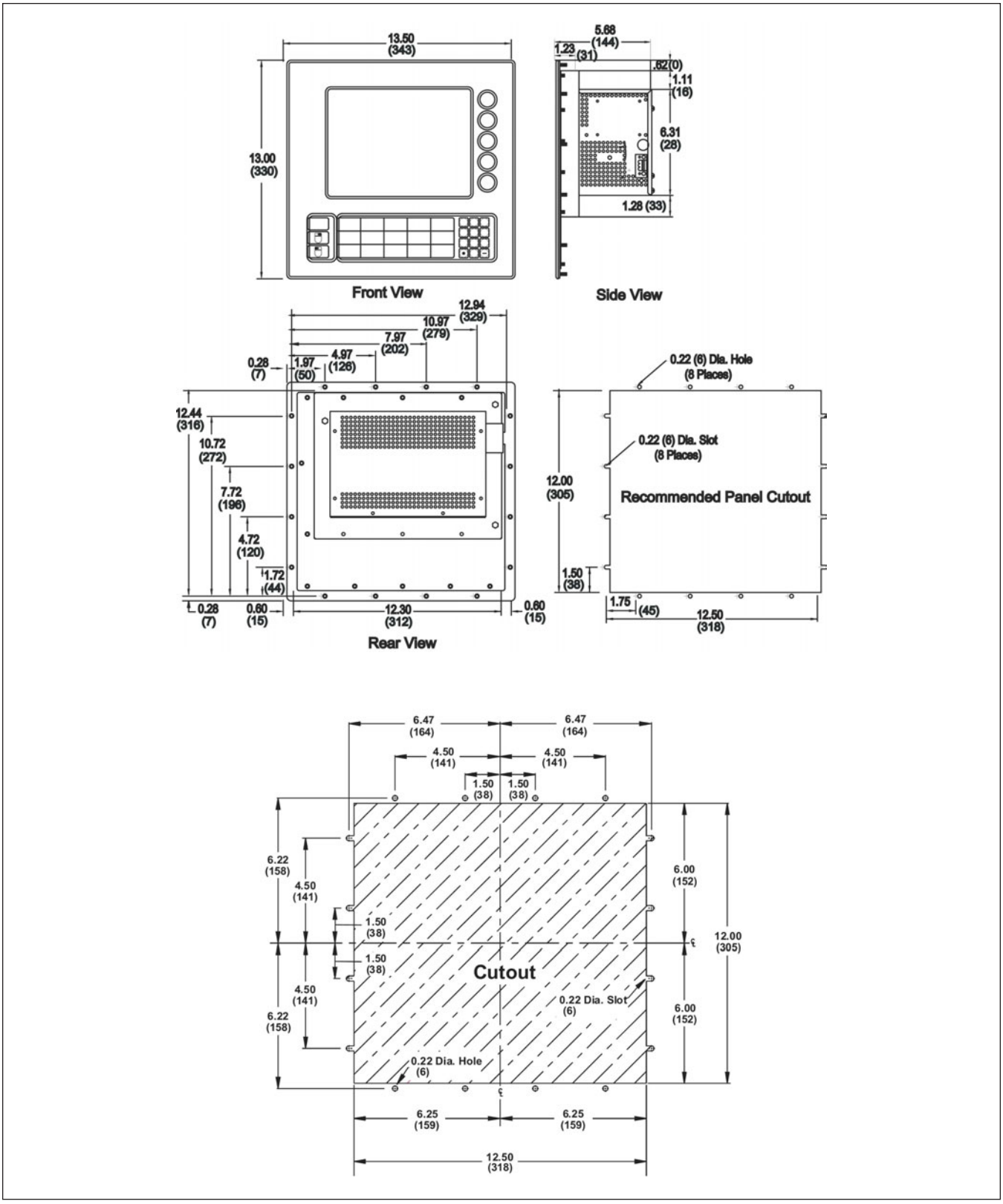

Figure 34.5-13. PanelMate ePro 7585K-10 Series

PanelMate ePro Unit — Dimensions in Inches (mm) (Continued)

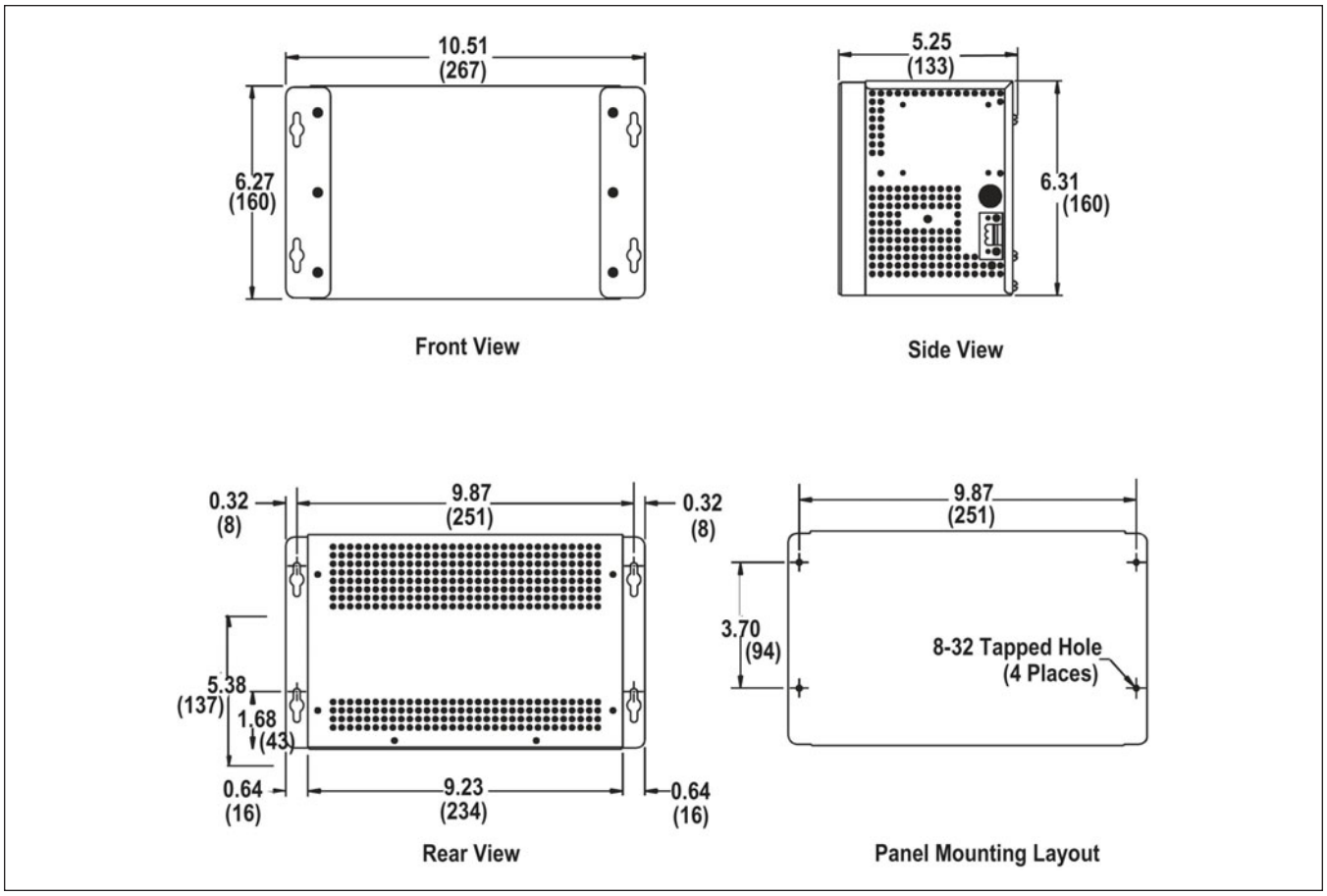

Figure 34.5-14. PanelMate ePro 7500

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Flat Panel Unit — Dimensions in Inches (mm)

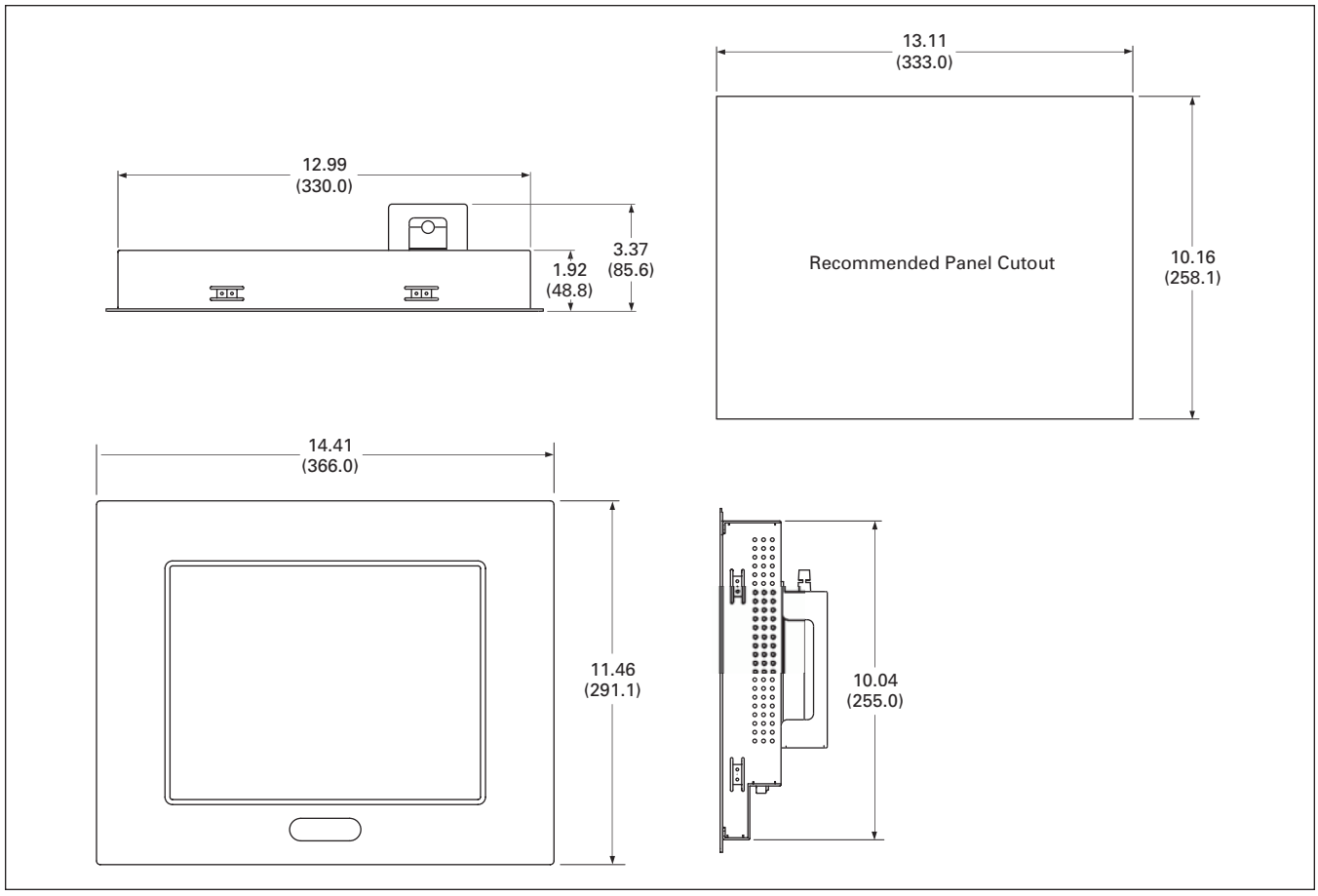

Figure 34.5-15. Flat Panel 7585DT-12

Flat Panel Unit — Dimensions in Inches (mm) (Continued)

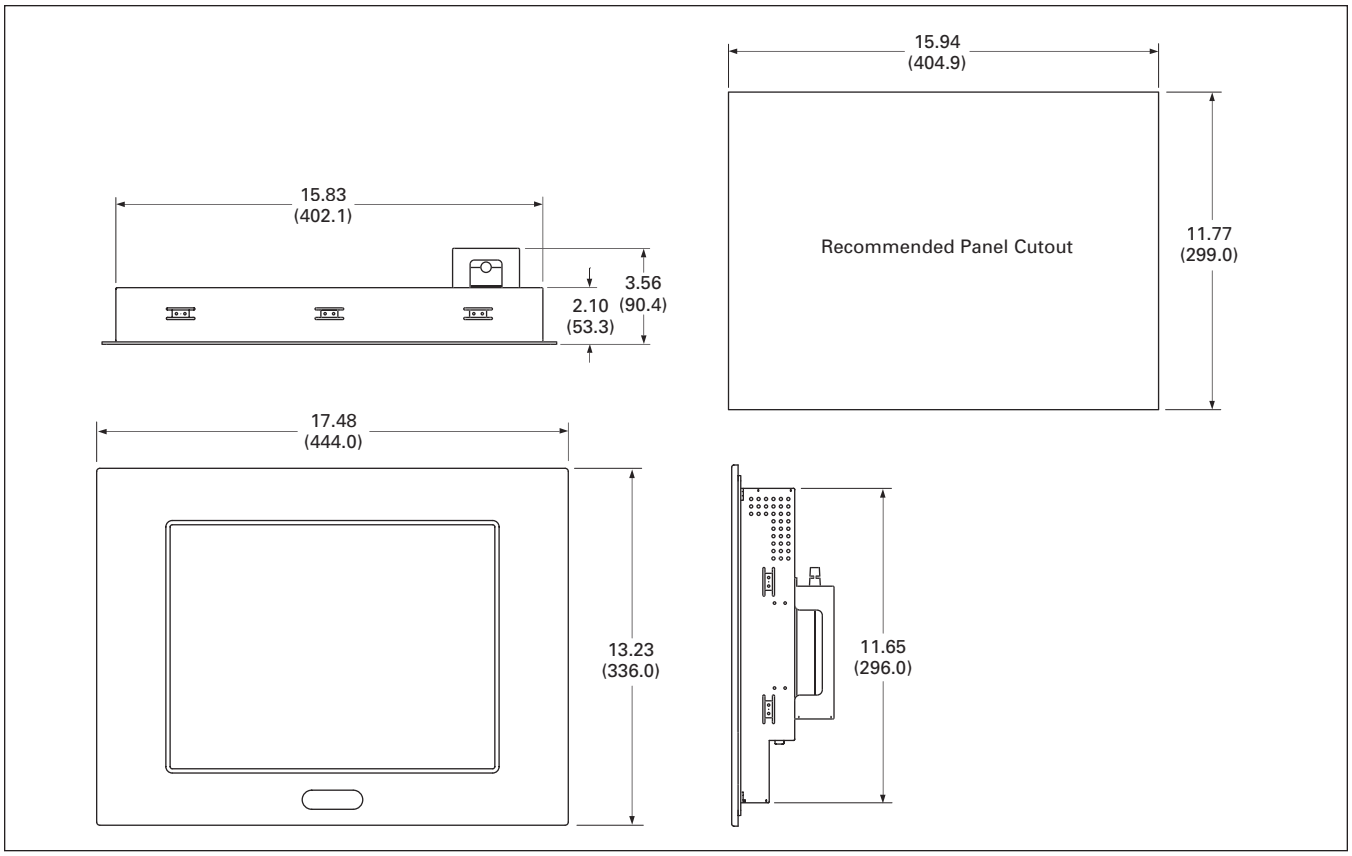

Figure 34.5-16. Flat Panel 7585DT-15

34

Flat Panel Unit — Dimensions in Inches (mm) (Continued)

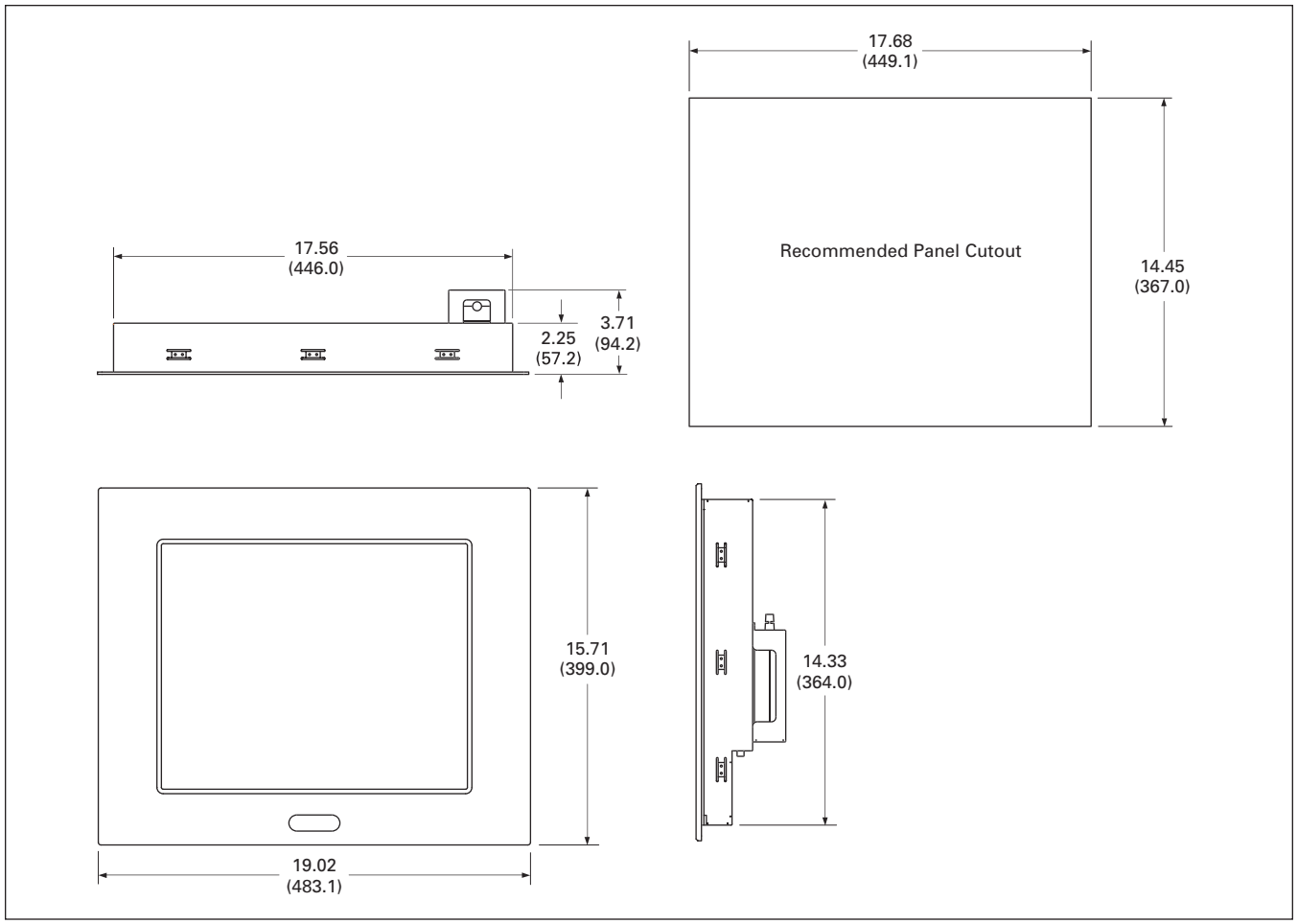

Figure 34.5-17. Flat Panel 7585DT-17

PanelMate ePro ES Unit — Dimensions in Inches (mm)

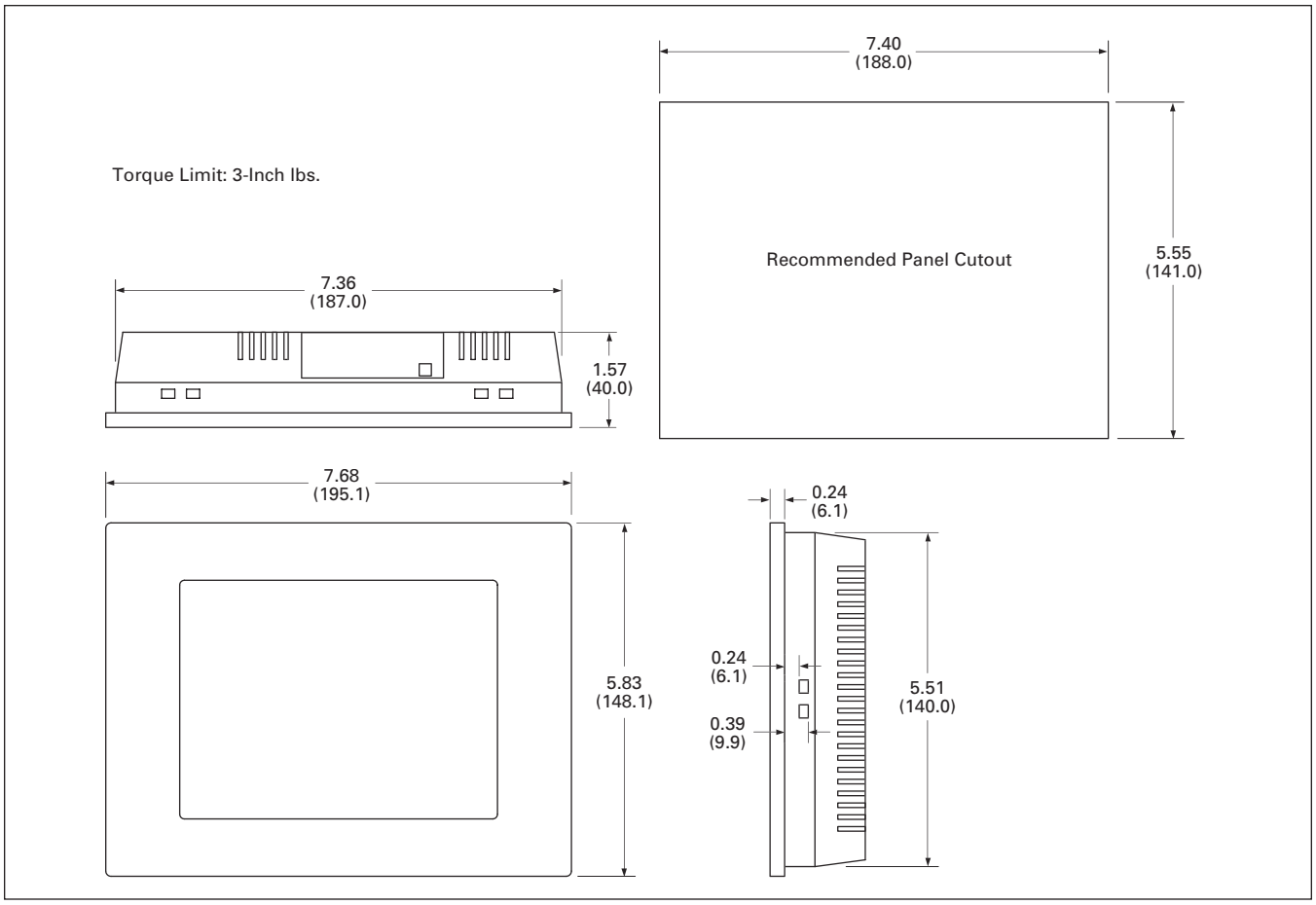

Figure 34.5-18. PanelMate ePro ES 7475T-6

Torque Requirements: 3-inch lbs.
for provided panel mounting screws.

Note: This drawing is available in .dwg format on the Eaton Internet site (www.EatonElectrical.com).

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PanelMate ePro PS Unit — Dimensions in Inches (mm)

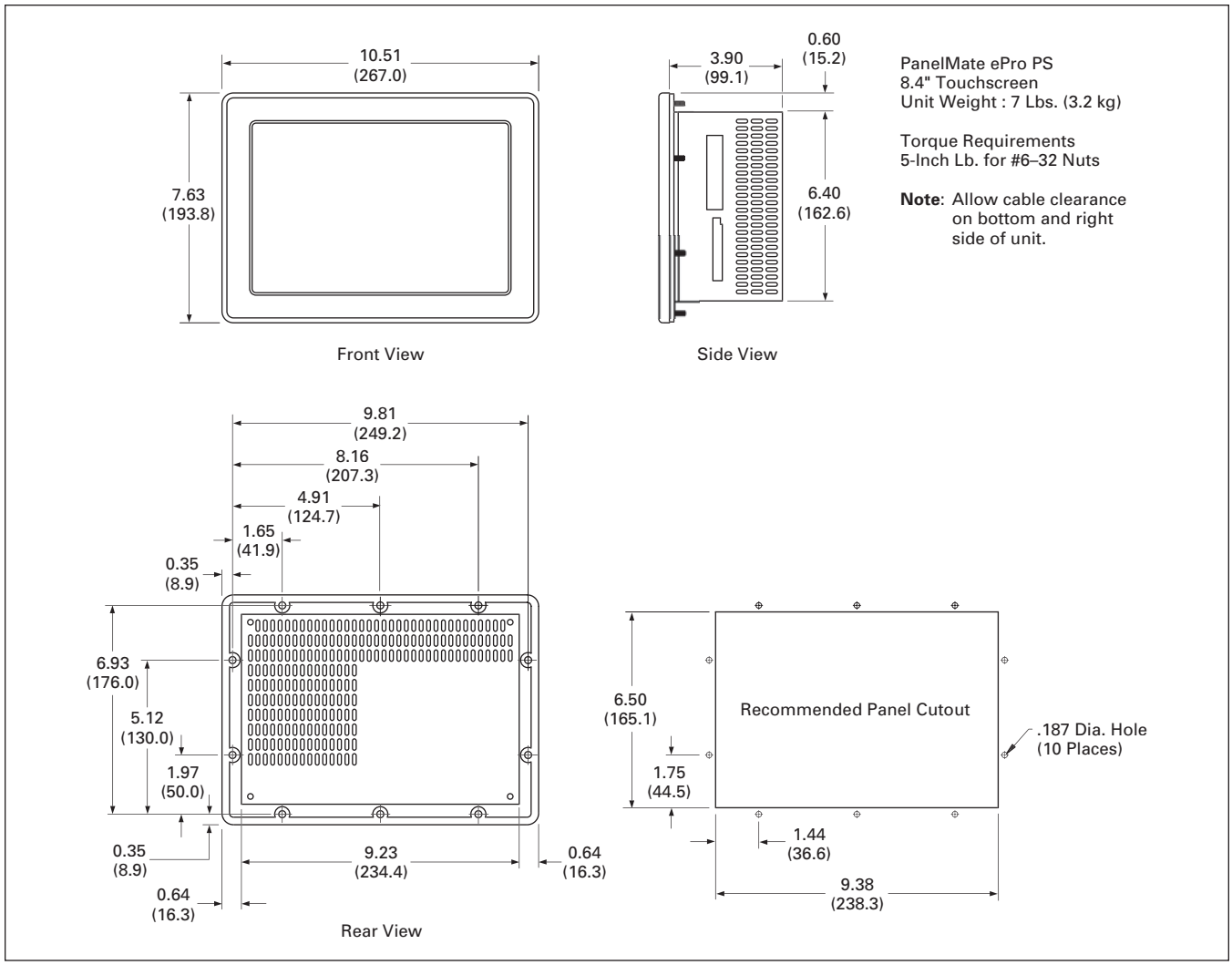

Figure 34.5-19. PanelMate ePro PS 7685T-8

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Torque Requirements: 5-inch lbs.
for #6 – 32 nuts.

Note: This drawing is available in .dwg format on the Eaton Internet site (www.EatonElectrical.com).

PanelMate ePro PS Unit — Dimensions in Inches (mm)

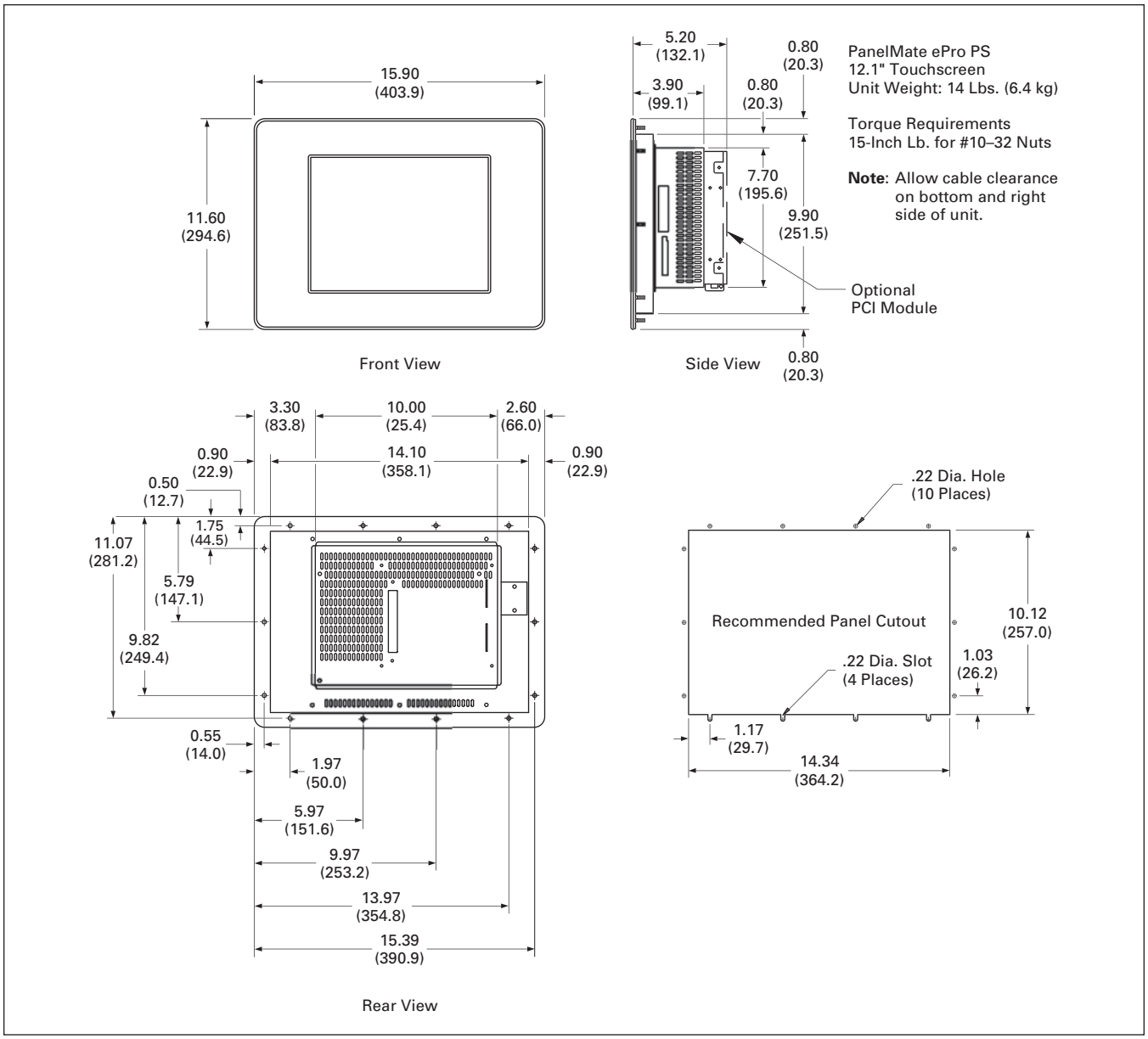

Figure 34.5-20. PanelMate ePro PS 7685T-12/7685ST-12

Torque Requirements: 15-inch lbs.
for #10 – 32 nuts.

Note: This drawing is available in .dwg format on the Eaton Internet site (www.EatonElectrical.com).

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PanelMate ePro PS Unit — Dimensions in Inches (mm)

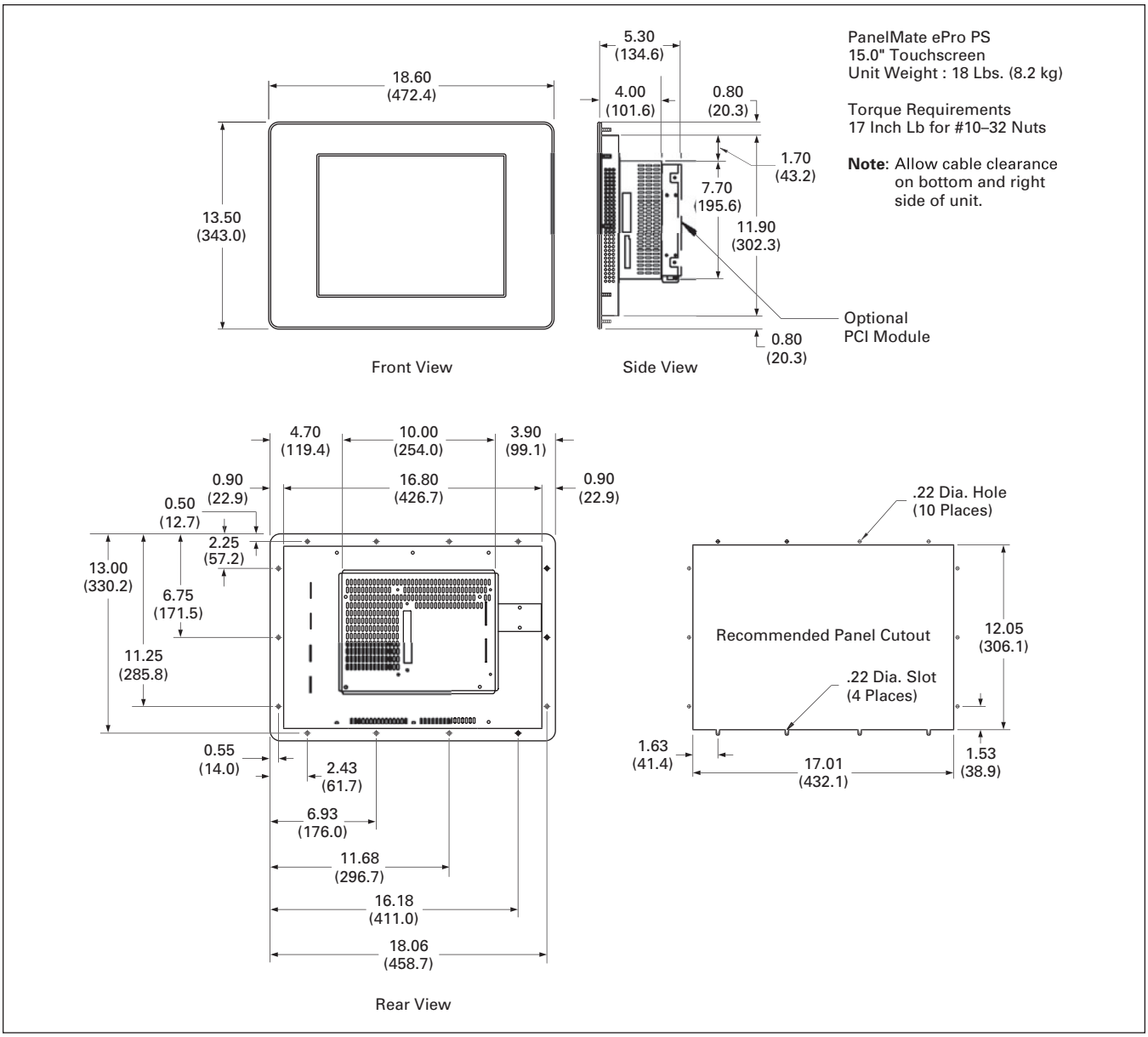

Figure 34.5-21. PanelMate ePro PS 7685T-15/7685ST-15

Torque Requirements: 17-inch lbs.
for #10 – 32 nuts.

Note: This drawing is available in .dwg format on the Eaton Internet site (www.EatonElectrical.com).

PanelMate ePro PS Unit — Dimensions in Inches (mm)

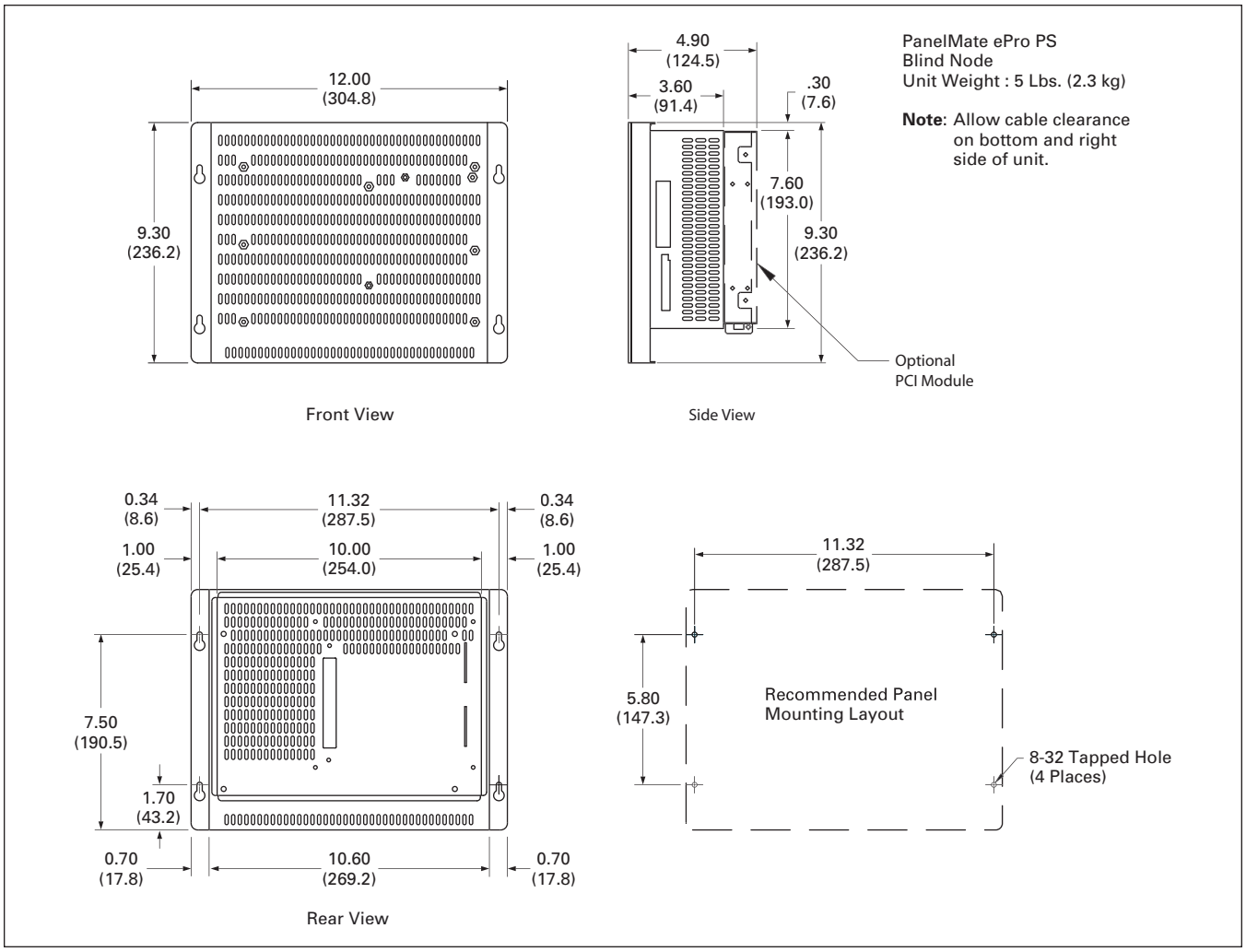

Figure 34.5-22. PanelMate ePro PS 7600

Note: This drawing is available in .dwg format on the Eaton Internet site (www.EatonElectrical.com).

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